ENGINEERING NEWS-RECORD

Tabler designs hotels for economy, comfort p.42

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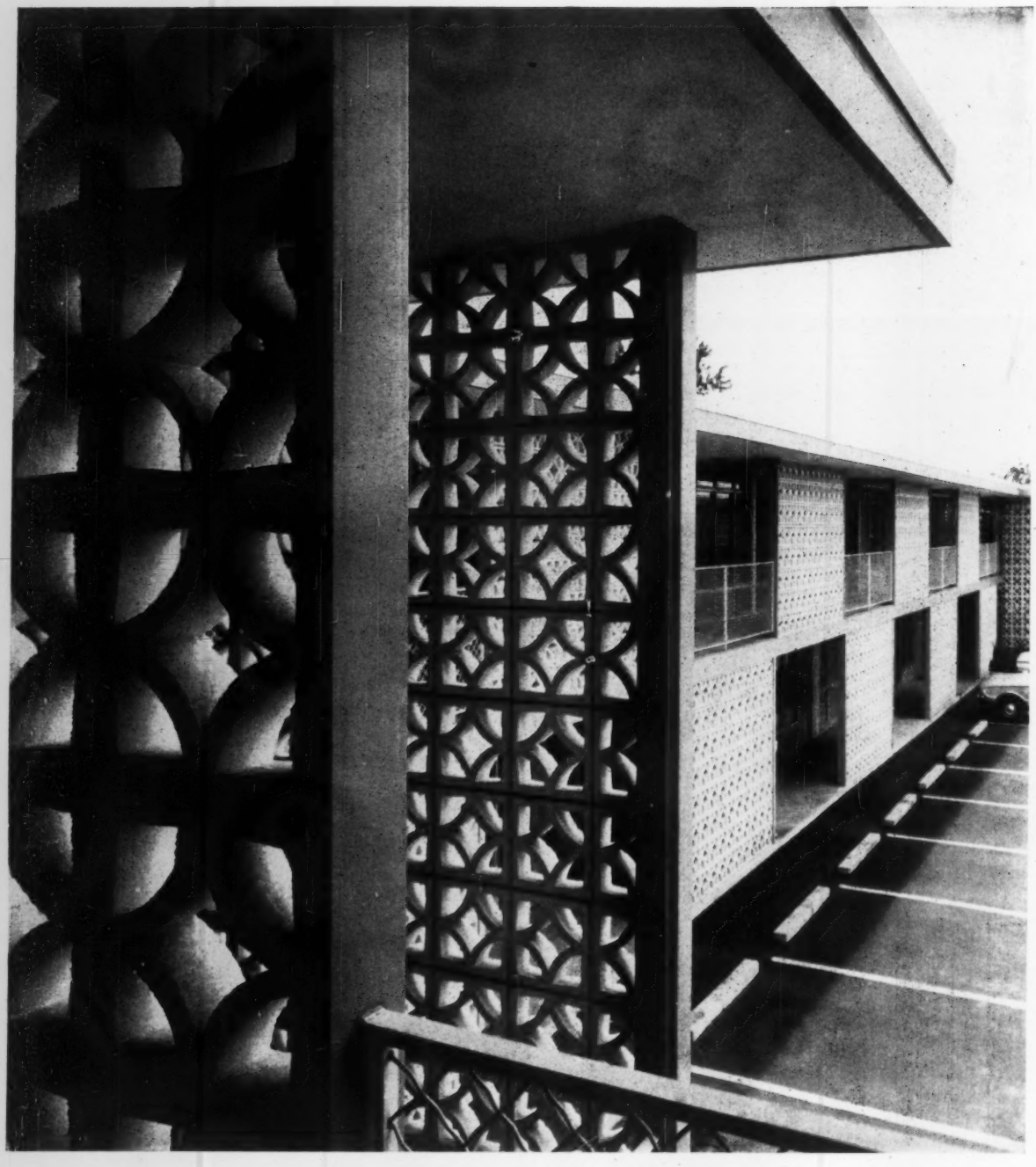

Inside and out, it's concrete

In designing the Towne House Motel, Hickory, N. C., the architect wanted materials that would reduce work indoors and "stop traffic" outdoors. His choice? Concrete... in masonry walls, poured-in-place floors, concrete block curtain walls, and in other forms. Penn-Dixie cement was one of the ingredients used in this striking example of concrete's versatility.

Architect: J. Hyatt Hammond & Associates, Asheboro • General Contractor: Guy Frye & Sons, Hickory • Ready Mixed Supplier: Hickory Ready Mixed Concrete Co. Concrete Masonry Units: Dixie Concrete Products, Inc., Mt. Airy, Shelby Concrete Products, Inc., Shelby.

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PENN-DIXIE MEANS PERMANENT DEPENDABILITY

Photographs, factual data, and quotations courtesy of Water Department, Wilmington, Delaware; W. Compton Wills, Manager and Chief Engineer.

Bare steel pipe, installed in 1907-1908, is still serving Wilmington, Delaware

Pardon the murky old photographs. They were taken in 1907, the year Wilmington began installing two major steel pipelines, totalling 20,340 ft. Even though this pipe was put in *bare*, it has given "very satisfactory service" during the past 54 years, and is reported by the Water Department to be "in satisfactory condition for use over the next 15 to 20 years or longer."

Of course, nowadays we don't recommend installing steel pipe without AWWA-approved protective materials. Many years of experience have convinced us that shop-applied coal-tar enamel assures incomparable protection from attack, and sustained carrying capacity. If Wilmington's *bare* pipe can serve for more than a half-century—with no end in sight—what is the reasonable service life of properly protected steel pipe? One hundred years? More?

Long service life, high flow capacity, tight joints, freedom from the failures of brittle materials—those are the advantages of coal-tar-enameled steel pipe. May we give you additional facts? Just get in touch with the Bethlehem sales office nearest you.

Wilmington's old steel mains comprise some 12,000 ft of 48-in. pipe and 8,000 ft of 43-in. pipe, all of lockbar construction with riveted field joints.

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EIGHTY SEVENTH YEAR OF PUBLICATION

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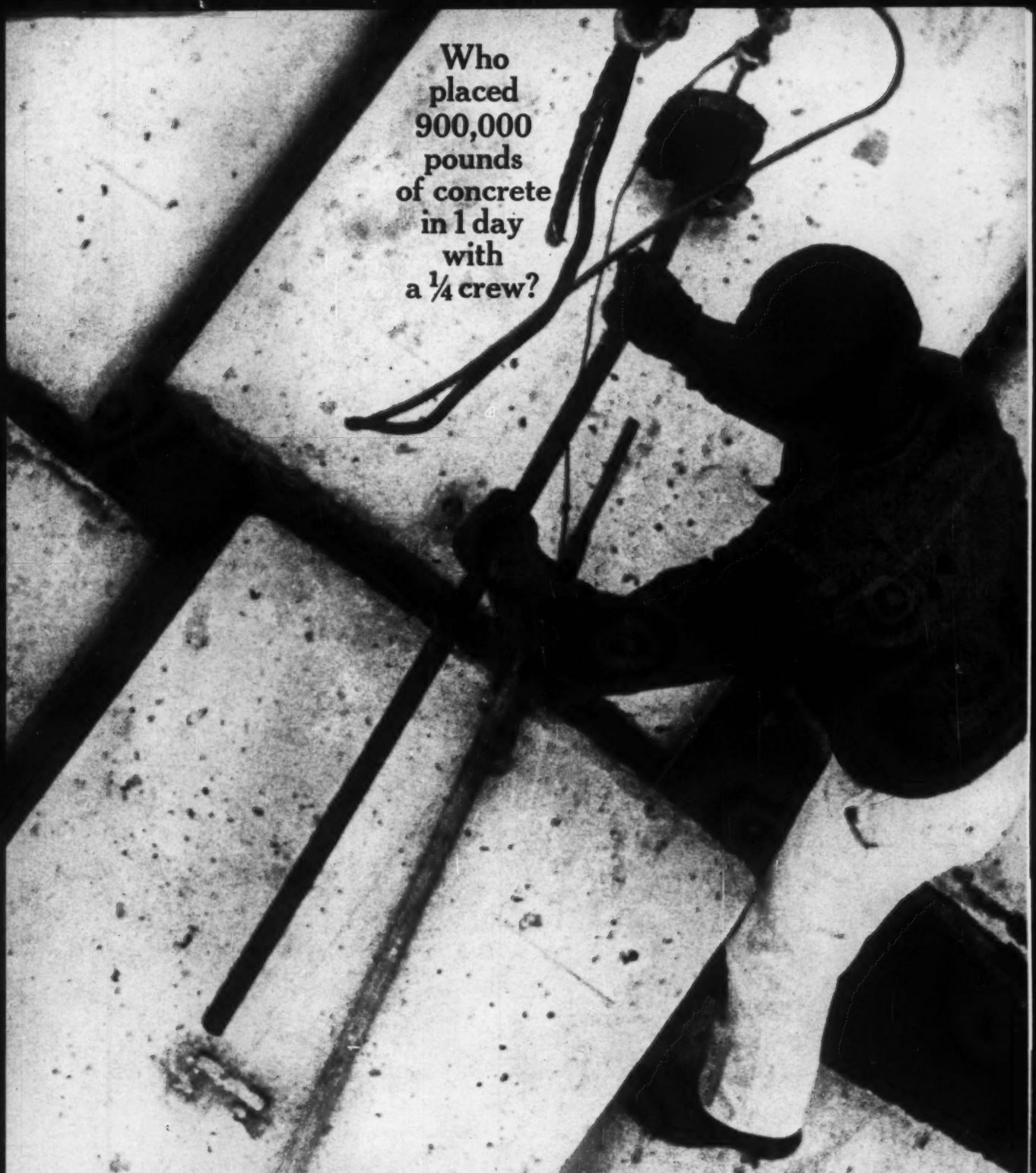
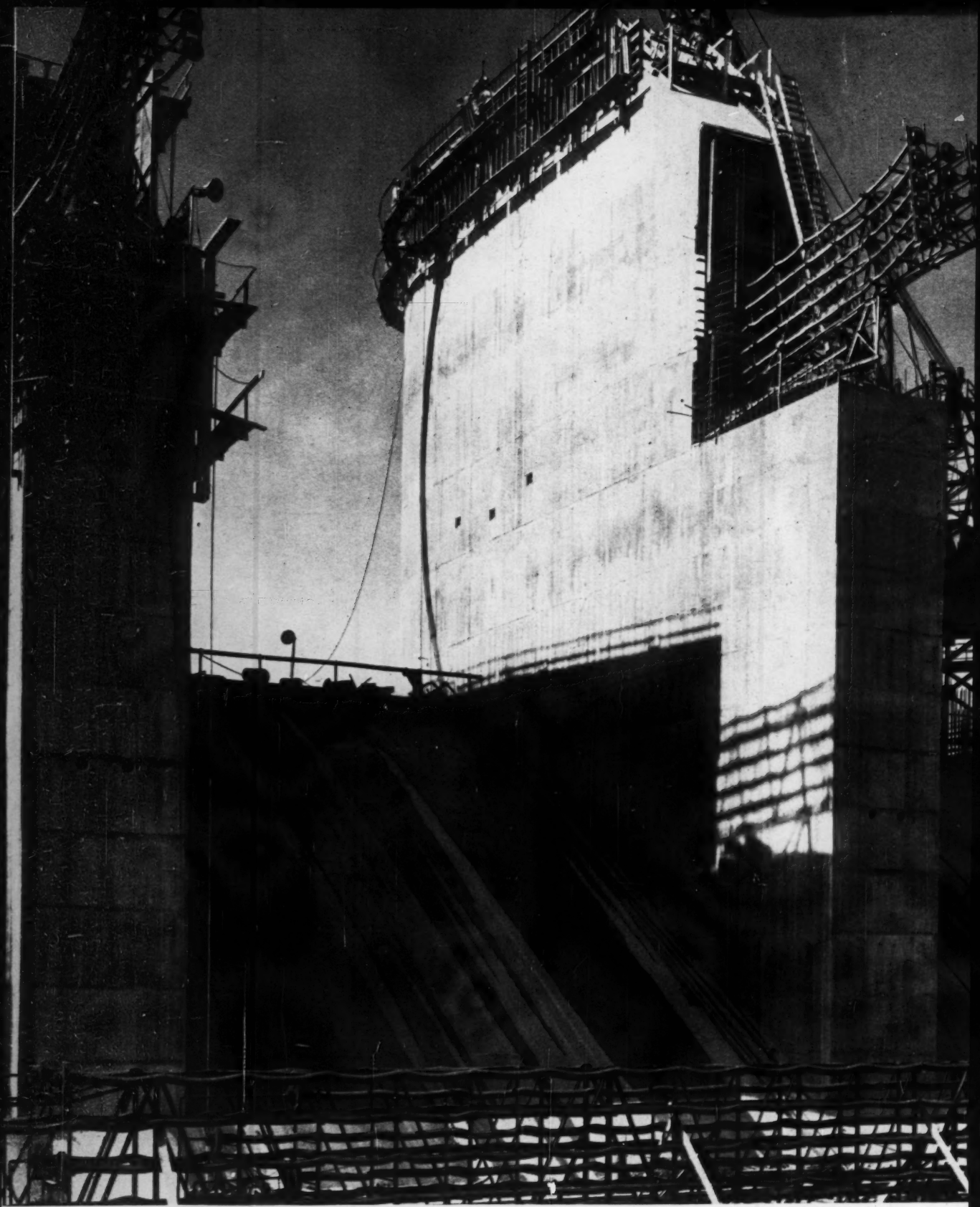


A pilot operating a Sikorsky helicopter. It would have taken two weeks and a full crew to do the job that was done in just *one day*. Petroleum Helicopters, Inc., working at Stevens Point, Wisc., for Houston Contracting Co., placed 320 concrete pipeline ballast weights at 2,800 pounds apiece, in swamp, in 6¼ hours. The job was done using a Sikorsky helicopter and ¼ of a normal crew. And that's not all. While the cost to place each weight by conventional methods could be as much as $75, the Sikorsky helicopter cut it down to $15 each . . . saving up to $60 per weight.

When you have a Sikorsky helicopter working for you, you save in dollars, you save in time, and you get a pipeline ready for work long before it would be by conventional methods. Why not write today for all the details.

Sikorsky Aircraft

Division of UNITED AIRCRAFT CORPORATION, Stratford, Connecticut



Close-up of spillway section. Note jigs containing post-tensioning assemblies. Two of the 12-ton units have already been placed on "A" frames to ±⅛-in. accuracy. A third (foreground) is ready for placement.

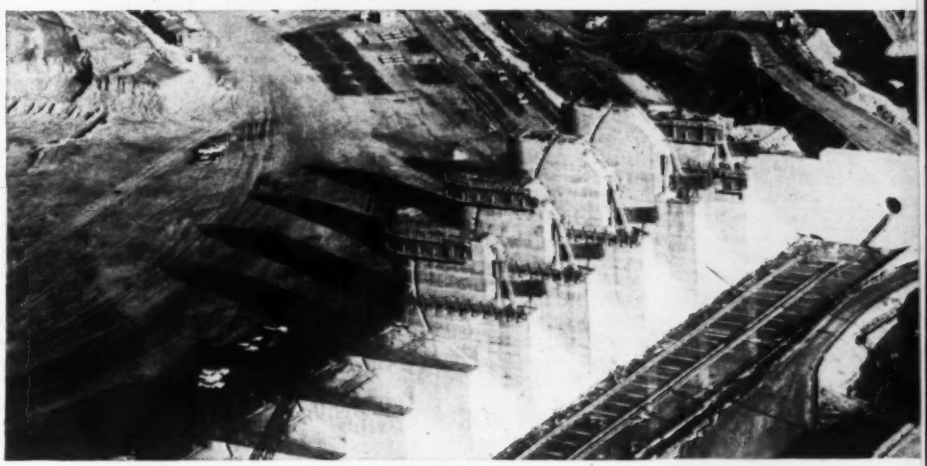
Tons of tensioning...

PIN-POINT PLACEMENT

⅛ OF AN INCH almost gets lost in the box-car figures that spell out the specifications for a dam the size of the new $93-million Wanapum Hydroelectric Development.

But ±⅛-in. placement accuracy was the spec Ryerson faced in supplying post-tensioning for the spillway piers. Each of the 11 center piers supports a tainter gate 50 ft. wide and 65 ft. high. Each gate will be subjected to water pressure of 3750 tons. To counteract this thrust on the gate, Ryerson post-tensioning assemblies are set into the piers as shown in photo at left.

The big problem for Ryerson: How to supply 14 tendons, weighing 12 tons, that could be placed to the minute accuracy of ±⅛-in.



Aerial view of Wanapum Hydroelectric Development on the Columbia River near Vantage, Wash. Each of the center piers contains fourteen 90-wire post-tensioning units—with a working force of 4400 tons. Prestressed concrete sections will support huge tainter gates. Owner: Grant County (Wash.) Public Utility District. Contractor: Grant County Constructors. Engineers: Harza Engineering Company, Chicago.

HOW RYERSON DID IT. But specialized knowledge that comes from close association with thousands of reinforced concrete construction projects solved the problem.

Fourteen 90-wire post-tensioning units—with a total working force of 4400 tons—were assembled in a jig 5 ft. wide, 10 ft. high and 75 ft. long.

Eleven such assemblies were built—one for each center pier. They were then trucked from the Ryerson plant in Seattle, directly to the job site. With a single crane, each 12-ton unit could be accurately positioned on three supports—meeting the ±⅛-in. spec.

831,250 KW GENERATING PLANT. Still another test of Ryerson reliability came on the 1540 ft. powerhouse section. It will contain 10 generating units, with space provided for six future units. To make this provision, the design calls for a light intake section fastened securely to the underlying rock with prestressed anchors.

In each of seventy-eight 16-in. dia. holes 74 ft. deep, Ryerson placed four 90-wire post-tensioning assemblies—each with a working force of 1270 tons.

Each hole was then filled with 30 ft. of cement grout and allowed to harden for two to three weeks. In a pull-out test, 1950 tons of pulling force could not break the wires, nor pull them out of the grout plug.

The creative assistance given on projects of this kind is one reason why Ryerson is first choice for post-tensioning on the nation's biggest, most important construction projects.

For details on our complete post-tensioning service, and our many products for the construction industry, call your nearby Ryerson plant.

12-ton Ryerson-designed post-tensioning assembly leaves Ryerson Seattle plant for the job site. Jig holding 14 tendons is 5 ft. wide, 10 ft. high and 75 ft. long.

RYERSON

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Foreign Aid Consultants: Pro and Con

SIR—Your editorial Engineers and Foreign Aid (ENR Oct. 5, p. 94) is a beautiful assist toward free training of young engineers employed by consulting firms. The real issues, however, are obscured. On p. 26 of this same issue under Cambodian Road the real issues are brought to light. The Cambodian road article is certainly not complementary to your editorial—and this article comes close to reporting the facts not just fantasy.

Whether ICA (now AID) employs the services of private consultants or chooses to use its own personnel or a combination of the two is immaterial. In either case the use of "young engineers" is not the answer to preventing what happened in Cambodia. If there were "young engineers" on the job there we had better locate them and be sure that they profit from the mistakes already made.

The Cambodian road mess is not unusual. This sort of thing is going on all the time. Most of the time these mistakes are kept pretty well covered up by the work of large and costly maintenance departments. At least it works that way here at home. "Rehabilitation" is a well known word in road building circles.

Let's face it—the trouble is lack of honest-to-goodness, on-the-spot engineering. We pay a consultant a big fee to furnish a design, then assume his responsibility for implementation of the design. This is similar to engaging a highly specialized brain surgeon to make the final diagnosis and then letting the family physician perform the operation.

From a realistic engineering viewpoint there can be no valid excuse for a highway costing millions of dollars to suddenly deteriorate. We just cannot build a major highway by remote control and expect it to function properly. The engineer who is responsible for seeing to it that the inherent complications connected with locating, investigation, materials testing, evaluation, designing, and implementing the successful conclusion of these things must be on the job from day to day. If the sponsoring agency or owner fails to select a capable engineer for the job then the results are most always unsatisfactory. This is no criticism toward the consulting firm but is a criticism of policy.

Now along comes someone who claims that placing more young engineers on the job will result in utilizing the know-how of an entire consulting firm staff. And you fellows fell for this promotional line which is not too surprising.

C. M. MINTON
Corpus Christi, Tex.

SIR—Having read your editorial Engineers and Foreign Aid (ENR Oct. 5, p. 94) I agree with Richard Hazen that ICA (now AID) should employ the services of qualified consultants to conduct feasibility and project evaluation studies, particularly since AID seems incapable of recruiting this kind of talent into its own ranks. This lack of recruiting ability was illustrated on page 26 of the same issue regarding ICA's failure to properly administer their Cambodian road project. However, some reflection is necessary in this regard.

AID is, unfortunately, not able to offer top-notch engineering or management people sufficient financial incentive to implement a successful recruiting program, irrespective of any and all efforts. It is a basic economic fact of life that one can hardly expect really competent professional engineers to work on overseas projects for less money than they can earn in the United States.

Although professional engineering firms are needed to conduct feasibility studies overseas, AID will need people who are capable of evaluating such a study. Comparable weak administration by government agencies in the United States would result in chaotic construction contracts. Moreover, no matter the quality of assistance which U. S. consulting-engineering firms may be able to lend AID, quality work cannot be insured by allowing incompetent and unqualified foreign firms the opportunity of contracting these jobs, nor can they be successfully accomplished by utilizing the utterly unjust and ridiculously small number of U. S. personnel on the construction phase.

Overseas Craftsman's Association, because of its 15 years' experience in witnessing overseas engineering construction efforts sponsored by our government, is spearheading an all-out campaign to return sanity to this country's foreign aid program through the utilization of U. S. engineering-construction firms and personnel on foreign projects financed by U. S. taxpayers' dollars. Support for this campaign is being received from not only our members, but from American construction workers and firms the world over.

GEORGE E. FISCHER
Secretary
Overseas Craftsman's Association
Los Angeles, Calif.

Mantaro Economics Defended

SIR—Mr. Adolph J. Ackerman's criticism of the Mantaro Hydroelectric Project in Peru (ENR July 27, p. 24, and Sept. 21, p. 24) requires an answer.

In June 1960, our firm, Regional Development Engineering Corp., was asked by Arthur D. Little, Inc., of Cambridge, Mass., to prepare a preliminary evaluation of the Mantaro site in connection with a general study of the Peruvian area which they were performing for the government of Peru. Following a visit to the site, we proceeded to review all existing data and reports on the project.

Based upon this review, we estimated that a gross head of 4,160 ft could be developed across the 19-kilometer-wide Mantaro River bend. Assuming 70%-load-factor operation and provision for upstream regulation, we found that the site was capable of supporting an ultimate installed capacity of 1,755,000 kw, including a spare unit. Without upstream storage, about half of this capacity could be justifiably installed.

Our findings were incorporated into a larger Arthur D. Little report, which was submitted to Peru in early 1961. This report has been largely responsible for the recent intensification of interest in the project.

Mr. Ackerman's conclusion several years ago that the project did not lend itself to sound economic development has not been borne out by the studies that we made. His principal problem seems to have been concerned with streamflow records.

As Mr. Ackerman well knows, stream-gaging procedures and records in some countries often leave much to be desired when compared to long-standing U. S. practice. This fact was recognized in many of the studies of the Mantaro Project, but Mr. Ackerman's statement that only a fraction of the claimed potential was available has not proven to be the case. Recent streamflow correlations indicate that the old records may have given dry season flows as much as 20-25% higher than actual. The dry season on the Mantaro is not of long duration and a deficiency of this magnitude could easily be made

(Reader Comment continued p. 14)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

GOODYEAR

Q: What do Goodyear Earthmover Rims have that no others have?

A: MORE times FOUR

1. MORE rims on the job: More tons are hauled on—more earth-moving equipment rides on Goodyear rims than on any other kind. Result: You reap the benefits of the widest, soundest experience in rim design, manufacture and use.

2. MORE kinds of rims: Maximum rim performance stems from proper specification. Goodyear makes the *only complete line* of earthmover rims. Result: The choice that permits you to get exactly the right rim for the job.

3. MORE rim engineering help: Goodyear has more engineers designing *and selling* rims than any other company. And they know tires, too. Result: The help you need in choosing the right rim for top performance—longer tire life.

4. MORE rim "firsts": The first *true* earthmover rim, the first 5° rim, the first tubeless rim—in fact, every major earthmover rim advance was made by Goodyear. Result: The very latest in rim design and manufacture at work, for you.

What better reasons for choosing Goodyear as your rim supplier? Only these: The desire and ability to design and build any rim that may be needed for *tomorrow's* earth-moving equipment. No matter what your rim needs or plans, you'll find it pays to call on Goodyear. See your local rim distributor, or write: Goodyear, Metal Products Division, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

fast, trouble-free water service connections with the **MUELLER® B-100 MACHINE** *and* **MUELLER CORPORATION STOPS**

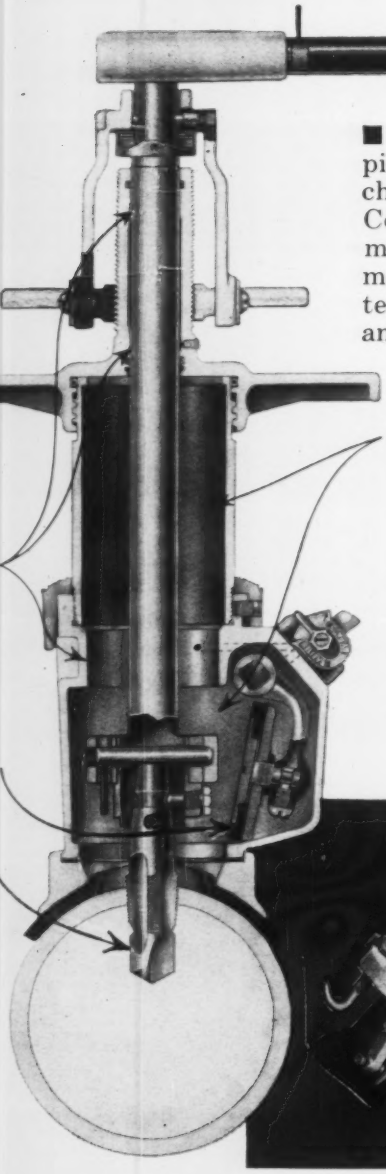
■ For over 90 years, the MUELLER Tapping Machine, MUELLER Tapping Machine Tools and the line of MUELLER Corporation Stops have been precisely matched in design and quality. This matched working team has given the Water Works industry its most dependable and economical service connections.

designed for ease of operation— perfect alignment— accurate, watertight connections.

Three bearing design of boring bar assembly assures perfect alignment with the main in all phases of operation. Absolute accuracy, longer tool life and ease of operation are dependable benefits of this engineering feature.

Offset flop valve design provides trouble-free means of isolating full water pressure in lower chamber.

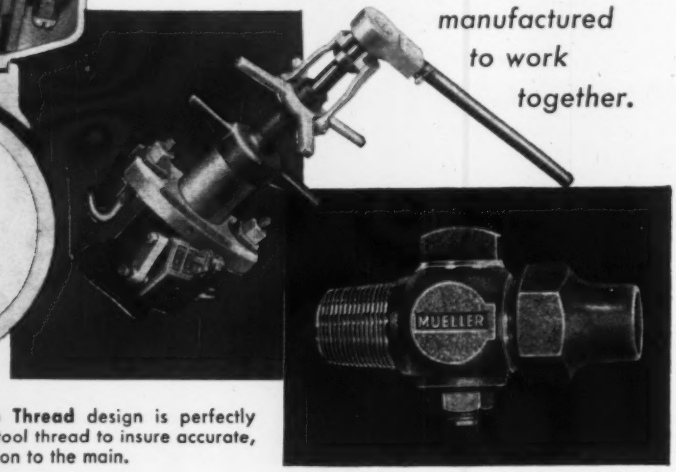
Matched Tool and Corporation Stop design allows easy, accurate fit and alignment in attaching to the boring bar.



Double Chamber design permits the service connection to be made under full water pressure in two separate operations—first the main is drilled and tapped; second, the corporation stop is inserted in the threaded hole in the main. *This is accomplished without interrupting water service and with no loss of water.*

Double Chamber design permits the machine to be handled in lightweight sections. The base section of the machine, which contains the valve chamber, is rigidly attached to the main. The top section, with the boring bar assembly, is removable. This gives complete flexibility of operation, such as allowing the tool or stop to be removed at any time during the operation, or permitting the extraction and replacement of old corporation stops.

design matched and precisely manufactured to work together.

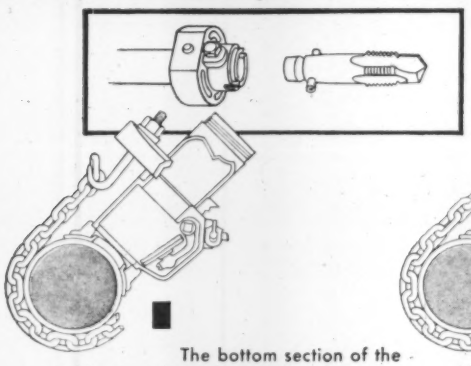


Corporation Stop Thread design is perfectly mated to tapping tool thread to insure accurate, watertight connection to the main.

For additional information, consult your Mueller representative or write direct.

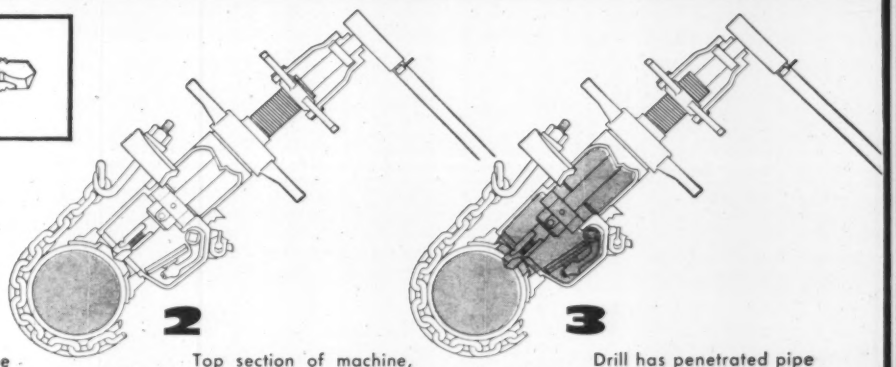
the inside story . . .

This time-proven method of drilling and tapping the main and inserting the stop under pressure guarantees trouble-free water service connections.



1

The bottom section of the machine containing the valve mechanism is secured to the main. The drilling and tapping tool is attached to the top section with boring bar assembly.

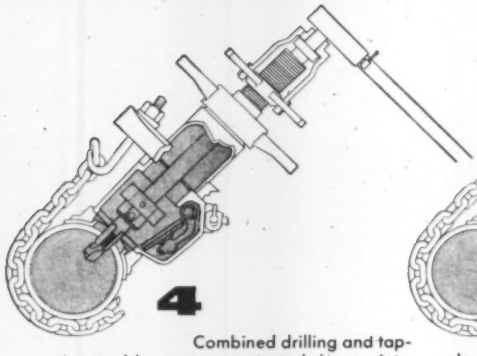


2

Top section of machine, with drilling and tapping tool attached to boring bar, is secured to base section. Flop valve has been opened and boring bar lowered to drilling position.

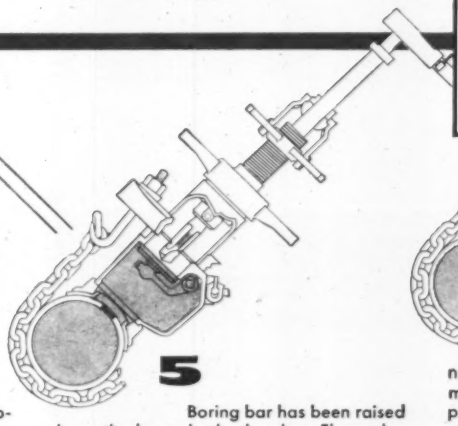
3

Drill has penetrated pipe wall—full water pressure is being controlled within entire body of machine. B-100 Machine can be either hand or power operated.



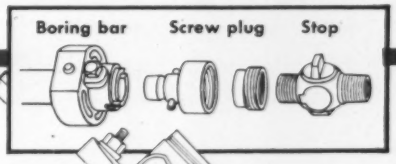
4

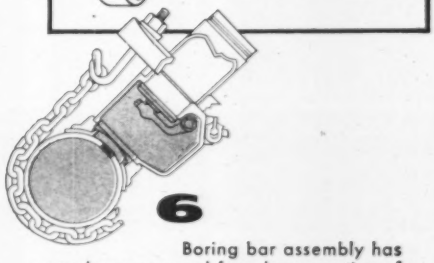
Combined drilling and tapping tool has now penetrated deeper into the main to cut accurate, matching threads for insertion of corporation stop.



5

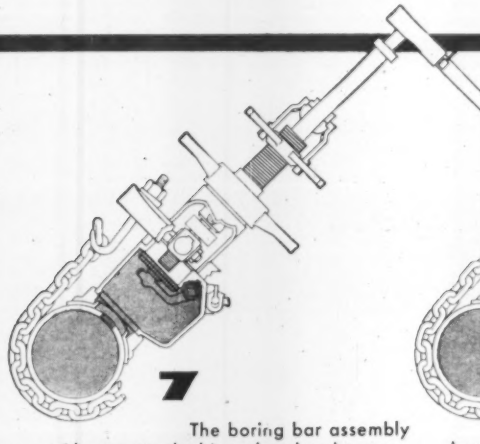
Boring bar has been raised above the lower body chamber. Flop valve is closed to confine water pressure to lower chamber. Entire boring bar assembly can now be removed without loss of water.





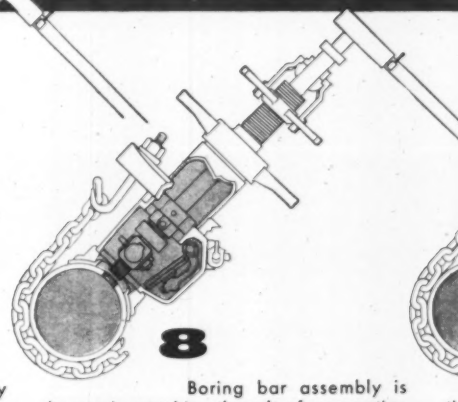
6

Boring bar assembly has now been removed from lower section of machine. At this point, the matching corporation stop is attached to the boring bar, replacing the drilling and tapping tool. Boring bar assembly can now be repositioned on machine without disturbing flop valve or water pressure.



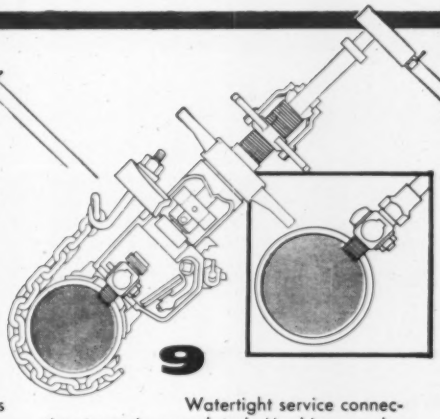
7

The boring bar assembly with stop attached is replaced on base section of machine. The precise alignment with the tapped hole is again assured for the insertion operation.



8

Boring bar assembly is lowered—matching threads of corporation stop and tapped hole allow easy, trouble-free insertion into main.



9

Watertight service connection to main completed. Machine can be removed and service piping attached to closed corporation stop. Stop is then opened to activate water service.

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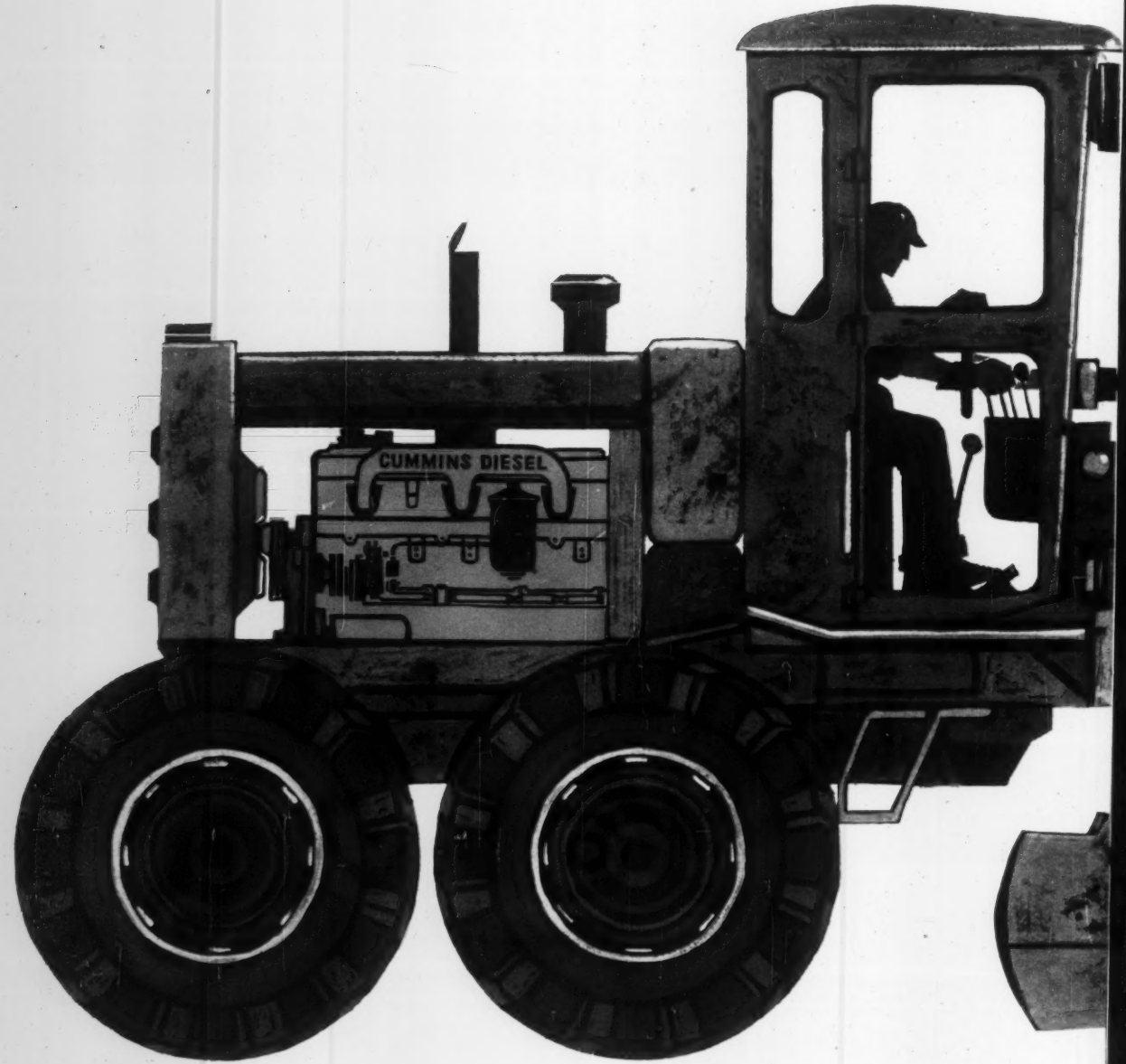

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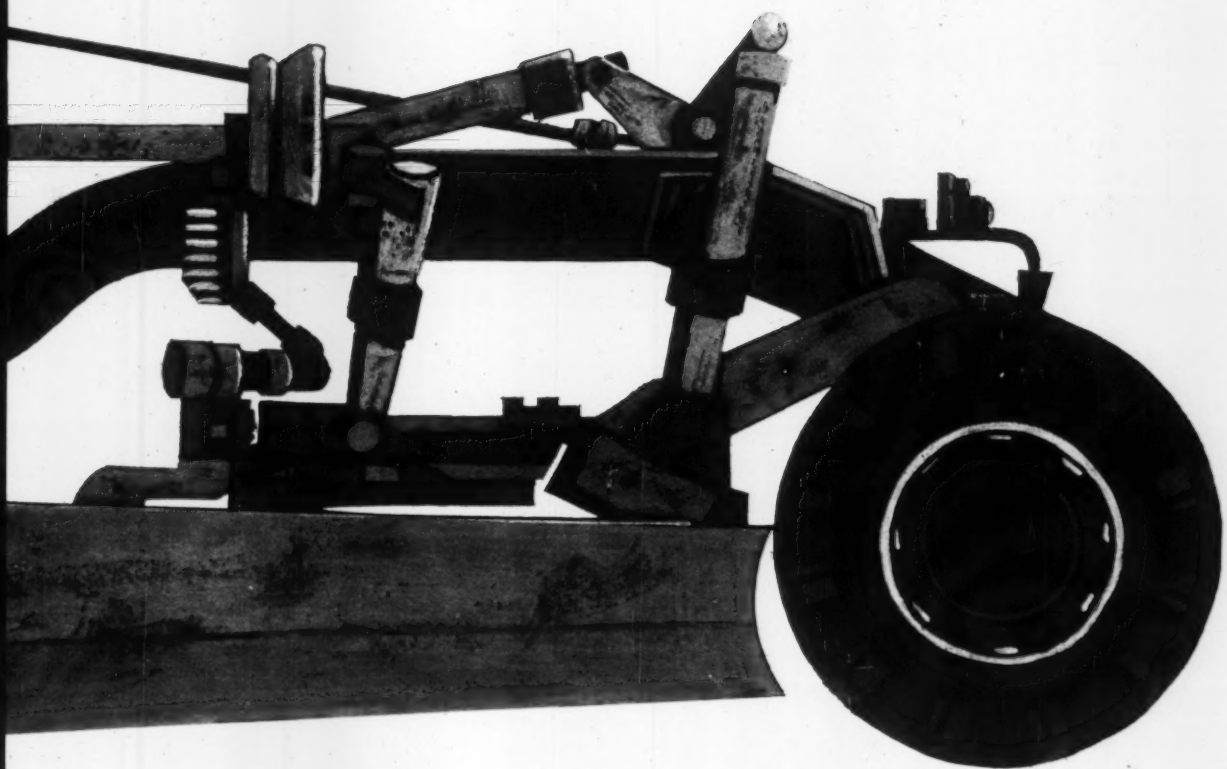

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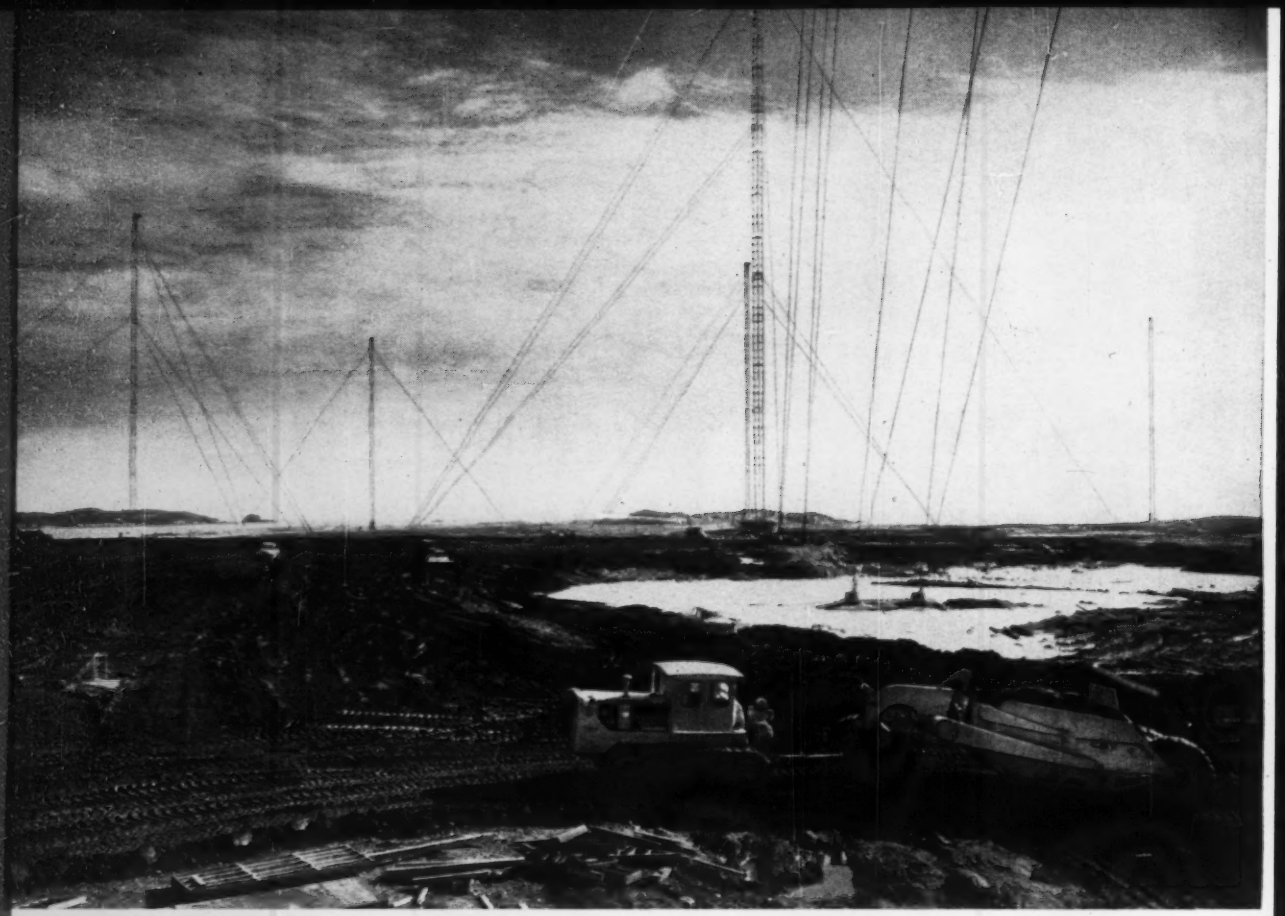
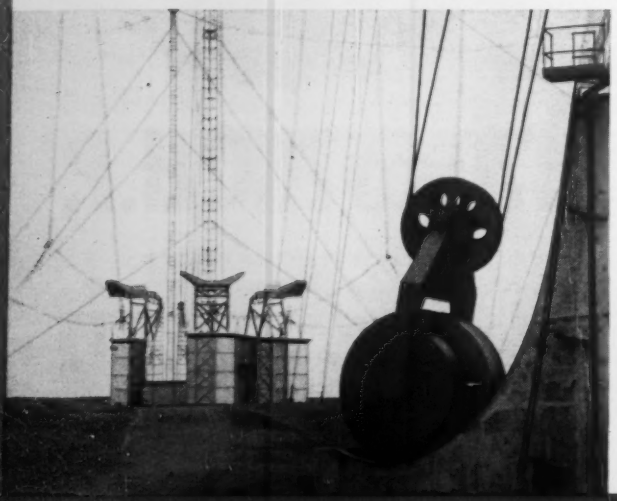
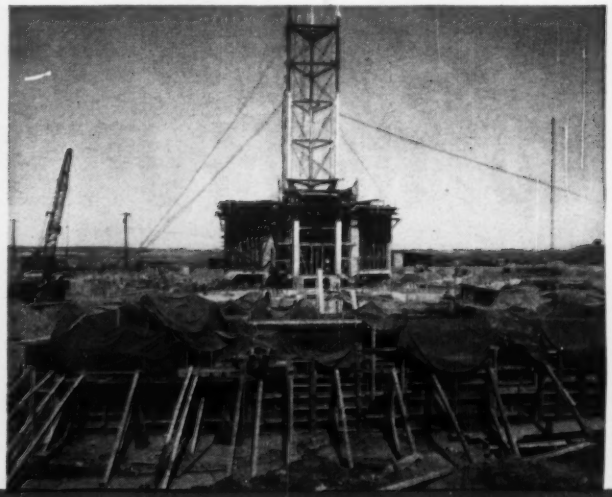


2,700-acre site was cleared of timber and 12 miles of road were built by the Navy, starting early in 1958. Continental Electronics was named prime contractor for all radio transmitting construction and electronic equipment. Photo above shows five of the 26 antenna towers and two of the many guy foundations. *Below left:* 405,000-pound rolling weights on special towers balance the pull of high winds and ice on antennas through 4-reeve blocks. Weights roll on guides curved to increase pull as antennas are deflected. In the event that the antennas become overloaded with ice, the entire system will lower itself to the ground.

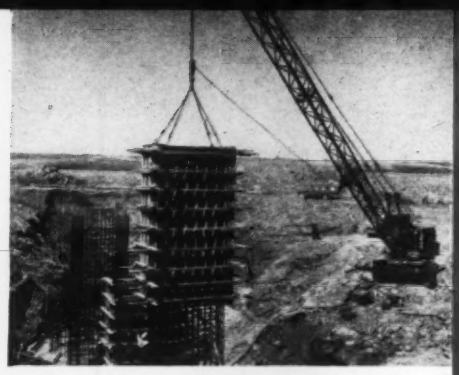
Weights consist of steel drums filled with 300,000 pounds of high density concrete (270 lbs./cu. ft.) controlled to within 1,000 pounds—an unusual specification in concrete pouring. Helix house is shown in background. *Below right:* Early construction for helix house, partially erected. Helix acts as an extension of antenna, tuning it to proper transmission frequency. External structural members permit smooth aluminum surface inside. Houses were designed by Continental Electronics.



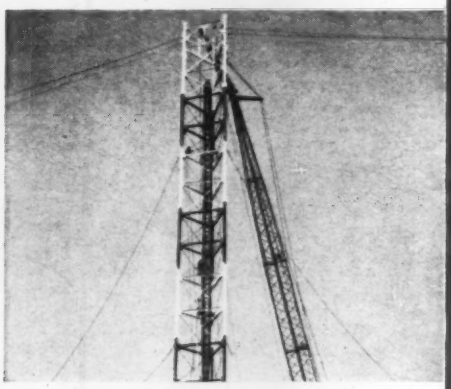


Knowing how one contractor meets the demands of time, efficiency and profit may help you in your next job.

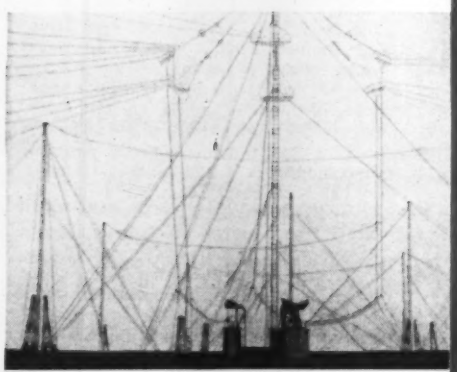
How Continental Electronics builds giant U.S. Navy radio station despite 40-mile winds and −25° F. cold



Lowering form over steel reinforcements prior to pouring concrete foundation. 90,000 cubic yards of concrete and 15,000 tons of reinforcing steel were used. About 1,300 people were employed during construction. 2,500,000 cubic yards of earth were moved. 2,200 miles of grounding cable were imbedded 12" in the earth.



Raising gin pole through center of tower after using crane to maximum height. Supported by the towers, gin poles were used up to 1,000 feet. There were no fatal accidents. Tower mid-sections are heavier to resist horizontal antenna pull-off load. Peripheral towers had outward camber so as to assume vertical position under antenna load.



Inner circle of one array. In each array there is a center tower 979.5 feet high surrounded by an inner ring of six 875-foot towers and an outer ring of six towers 799 feet high. Ice can be melted from antennas by 4,000,000-watt electrical heating. Either of the two antenna arrays can be heated while the other transmits.

26 giant towers, ranging up to 979.5 feet high, mark the site of the recently completed U.S. Navy Very Low Frequency Radio Station at Cutler, Maine—largest and most powerful Navy radio installation for surface fleet and submarine communication. Total project cost $68.5 million. Continental Electronics Manufacturing Company was prime contractor for $47 million. Transmitting capacity is 2,000,000 watts. The two antenna arrays of thirteen towers each cover an area greater than 11 Pentagon buildings. Other installations include an operations building, helix houses and a power plant to handle electrical requirements.

Navy clearance of the site was started in the spring of 1958 after which Continental Electronics Manufacturing Company was brought in as prime contractor. The Navy Bureau of Yards and Docks was the contracting agency for the Bureau of Ships. Construction was pushed to completion one year ahead of schedule. No seasonal weather concessions were made. Tower and guy foundations were poured at temperatures as low as −25° F. using heated concrete, protected while setting. Tower construction was carried on even in gale winds. Severe weather increased the difficulties of operating mechanical equipment.

Mobil on-site co-operation was used to aid in organizing lubrication and preventive maintenance. This included check sheets and other control records, lubricating truck design, inventory control and engineering service. Mobilgas, Mobilfuel Diesel, Delvac, Mobilgrease, and Mobilube were the principal Mobil products supplied to both Continental and its subcontractors.

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. . . Reader Comment

up by somewhat increased upstream storage.

Certainly, when developing a river the size of the Mantaro over a single drop of over three-quarters of a mile, considerable efforts at upstream regulation are unquestionably justified and must be considered in evaluation of the project. In fact, one such storage site, Lake Junin, already exists and is used to some degree for downstream flow regulation.

Other similar possibilities for natural storage exist. It is also entirely feasible to build pumped storage facilities to utilize wet-season pump power from the Mantaro Project to provide stored water for dry-season use.

It is these considerations which led to the decision not to underestimate the potential of the power site.

Estimated capital costs of the ultimate development at Mantaro, including all transmission lines and provision for upstream storage, would be $135 per kilowatt. During an 11-year period of development, average cost of energy delivered to a large electrometallurgical installation at Pisco on the coast would be about 2 mills. Average delivered cost to Lima and other large users would be less than 4 mills. And average cost to large-scale pumped-irrigation farmers in the coastal areas would be less than 7 mills delivered at point of use.

At the end of this period these costs would be still lower. If a large electrometallurgical load does not develop and the project is developed to only half its ultimate capability during the same period, delivered energy costs would be some 15 to 25% higher.

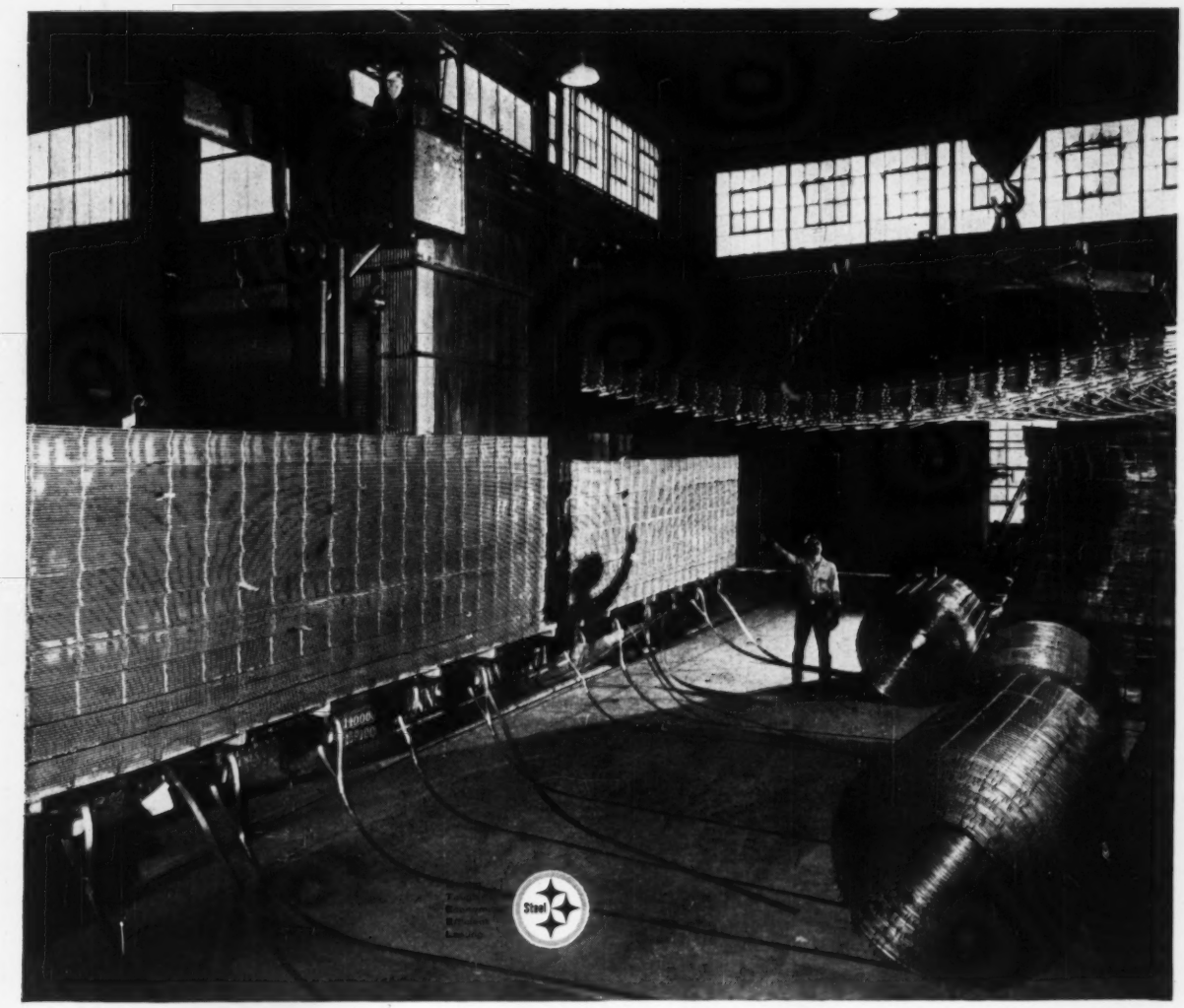
If these figures do not suggest economic soundness, I would inquire what criteria Mr. Ackerman is using.

Of primary importance in our studies was the question of how this tremendous project could be put to work for the benefit of Peru. An integrated development of a major area south of Lima, based upon low-cost Mantaro power, would be made possible. This development would consist of the establishment and expansion of large metallurgical industries fed by Peru's rich store of minerals and the utilization for high-yield agriculture of the fertile coastal lands made possible by pumped irrigation.

The basic resources are at hand and low-cost power from the Mantaro Project is the catalyst which makes such development possible.

We do not believe that Mr. Ackerman's ill-informed public criticism, well intended though it may be, is appropriate at this moment when Peru is embarking on a major undertaking which will profoundly affect its people and perhaps even all the people living in this hemisphere.

W. L. VOORDUIN, PRESIDENT
Regional Development Engineering Corp.
New York, N. Y.



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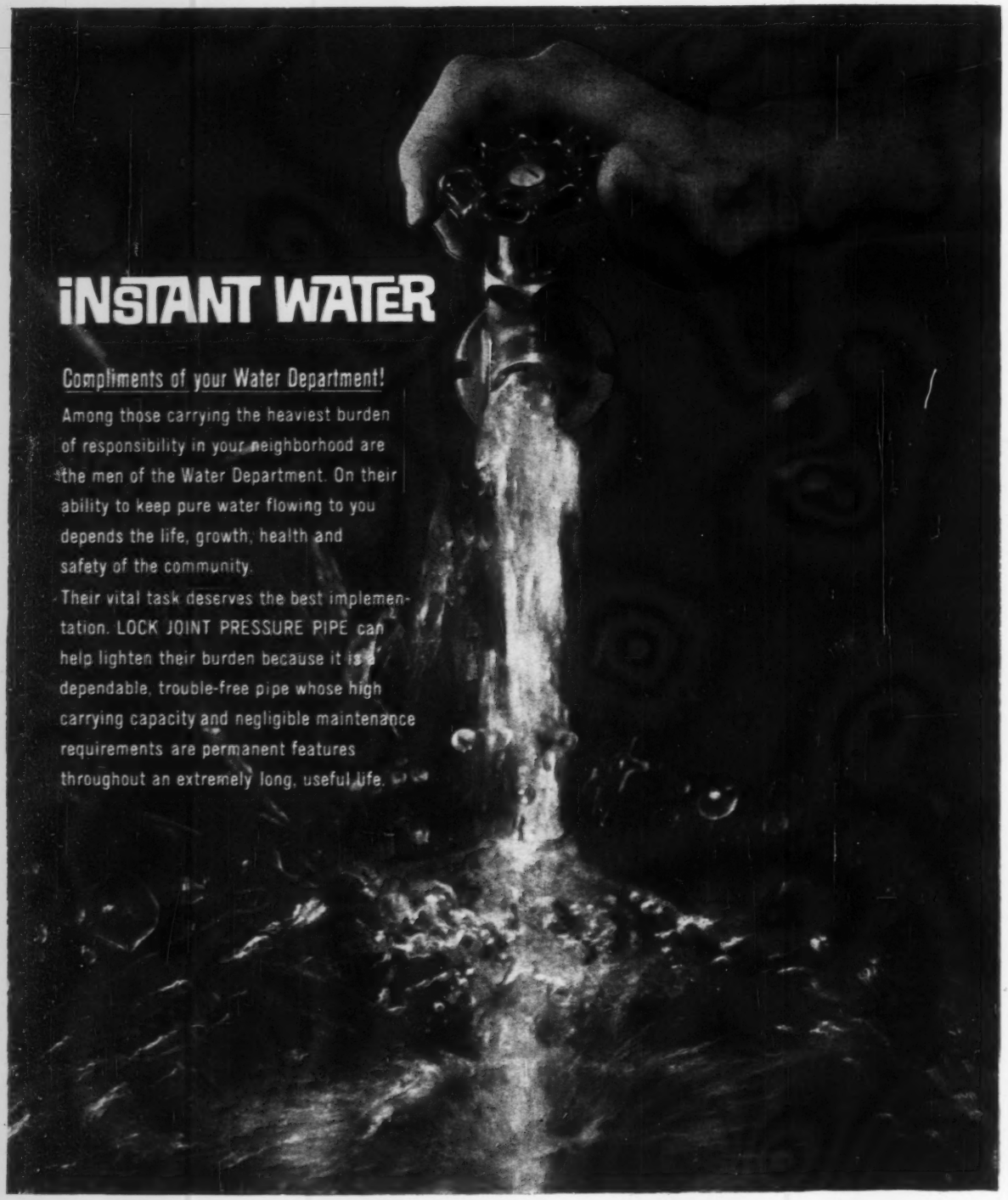
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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

TAX-CHANGE TALK—Securities underwriters attending the Investment Bankers Association convention in Florida say the Treasury Department, among other tax-revision requests, may ask Congress to subject income from state and municipal bonds to federal taxes. Their present tax-exempt status gives communities a competitive edge when in the market for construction-financing funds.

REDESIGNING UNDERDESIGN—A report still in the writing will reveal late this year that some underdesigned steel grandstand trusses in Birmingham's Legion Field Stadium can be strengthened without removing any of the erected structure. Since discovery of the design errors last month, the 8,600-seat, upper-level grandstand has remained unoccupied. Birmingham hired Rust Engineering Co., Inc., of Pittsburgh to investigate and make recommendations for corrective work.

PAY TO RIDE TO FLY?—Sen. Mike Monroney (D., Okla.) again is plugging his idea of building tollroads from downtown centers to new jet airports. The chairman of the Aviation Subcommittee of the Senate Interstate and Foreign Commerce Committee says he will introduce a bill in the next session of Congress to build a 14.5-mile tollway extending from the Virginia side of the Potomac River to Dulles International Airport.

BULLDOZER IN A CHINA SHOP—Four young construction buffs startled Thanksgiving diners in a Delaware suburb last week. The boys started a parked bulldozer which proceeded to knock down two small buildings, tear out a kitchen wall, and smash three cars, while doing considerable miscellaneous landclearing in between. The damage estimate is placed at between $7,500 and $10,000.

TOO EXCLUSIVE?—Opening day for the $9.6-million Boston Common Underground Garage, scheduled to be the world's largest underground garage after construction doubles its present 1,400-car capacity, brought some unforeseen difficulties. A test run by the Boston fire department revealed that the entrances are too small for the equipment to get in. The fire chief has ordered a special low-slung fire engine stationed permanently inside the tunnel.

UNION ELECTION HANGS FIRE—The apparent rejection of the plumbers union as bargaining agent for plumbers and pipefitters employed by Daniel Construction Co. in six states indicates that unions still have tough sledding in the South. In a National Labor Relations Board election, the vote was 174 for the union, 520 against. But still to be determined was the disposition of 651 additional votes returned by mail, challenged and uncounted.

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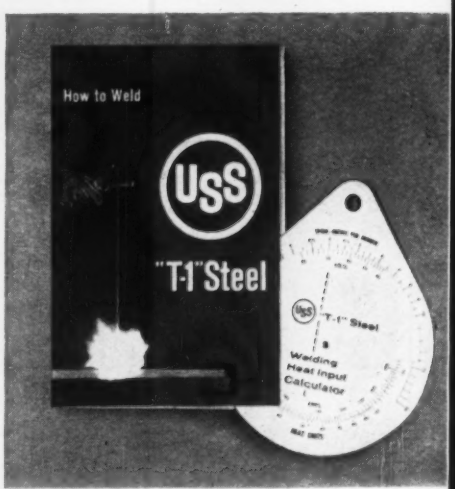

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WASHINGTON OBSERVER

- **FAA invests $4.6 million in mobile lounges**
- **White House hesitates on anti-bias order**
- **Brazil gets construction aid transfusion**

● **The revolutionary concept of mobile lounges for jet airports finally has won approval of the Kennedy Administration.** After months of hesitation and testing, Federal Aviation Administrator Najeeb Halaby ordered purchase this week of 20 of the huge lounges, at $230,000 each, from the Chrysler Corp. of Detroit and the Budd Co. of Philadelphia. Five will be delivered to Chantilly, Va., in time for the opening of Dulles International Airport next October. Five more are due in December, 1962, the rest by March, 1963.

FAA approval of the lounges for Dulles does not mean they'll be used for any other airport. First, most airport operators will want to see them in actual operation, despite the 5,000 miles of prototype tests—the equivalent of about three years of use—at Dulles. Second, they would not likely be installed at existing airports. Third, a $30,000 bus will do the same job almost as well.

Introduction of the lounges at Dulles could influence, however, the new approach to construction of future jet airports. Proponents say thousands of dollars in construction costs can be saved by eliminating loading fingers that stretch from the terminal to aircraft loading ramps. In addition, the lounges are designed to save passengers the considerable time and many steps now necessary to reach their planes at most central terminals.

—

● **An Executive Order to ban discrimination in federally aided housing projects is ready for President Kennedy's signature.** But there is no guarantee that he will sign it. White House aides say the President is worried about whether southern members of Congress would block his efforts next year to raise the Housing and Home Finance Agency to Cabinet-level status in retaliation and whether such an order might put a crimp in expansion of the housing industry and the entire economy.

The order written by Administration officials for Mr. Kennedy's signature goes pretty far. It would ban discrimination in public housing, housing for the elderly, urban renewal projects and private homes financed through federally insured programs, such as FHA and VA. The anti-discrimination order also would cover mortgages by some lending institutions which come under federal supervision—but not commercial banks regulated by the Federal Deposit Insurance Corp.

—

● **Massive financial aid—much of it for construction projects—is being rushed to Brazil to help preserve that country's shaky government.** The total by the end of the first quarter of 1962 will run between $500 million and $600 million. First grants and loans will help cover payments for Brazilian imports of essential products from the U.S., including some specialized construction equipment.

Over the longer haul, funds will go for a variety of electricity, housing, water supply, irrigation and land reform projects. Negotiations also are under way for the shipment of as much as $400 million worth of surplus wheat from the U. S. to Brazil. The Latin country would pay for the wheat, at reduced rates, in its own currency but keep the money and put it into construction projects.

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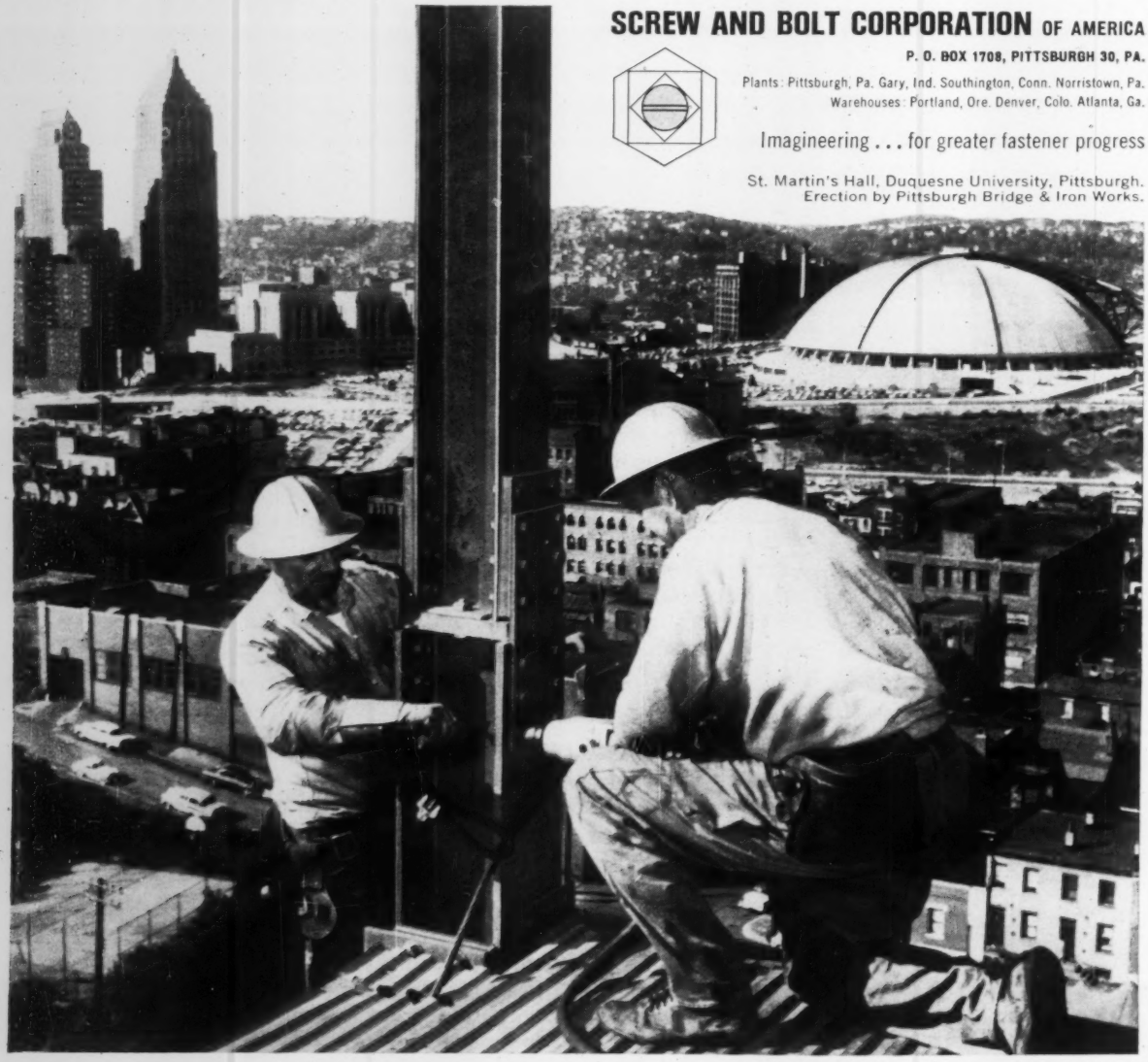
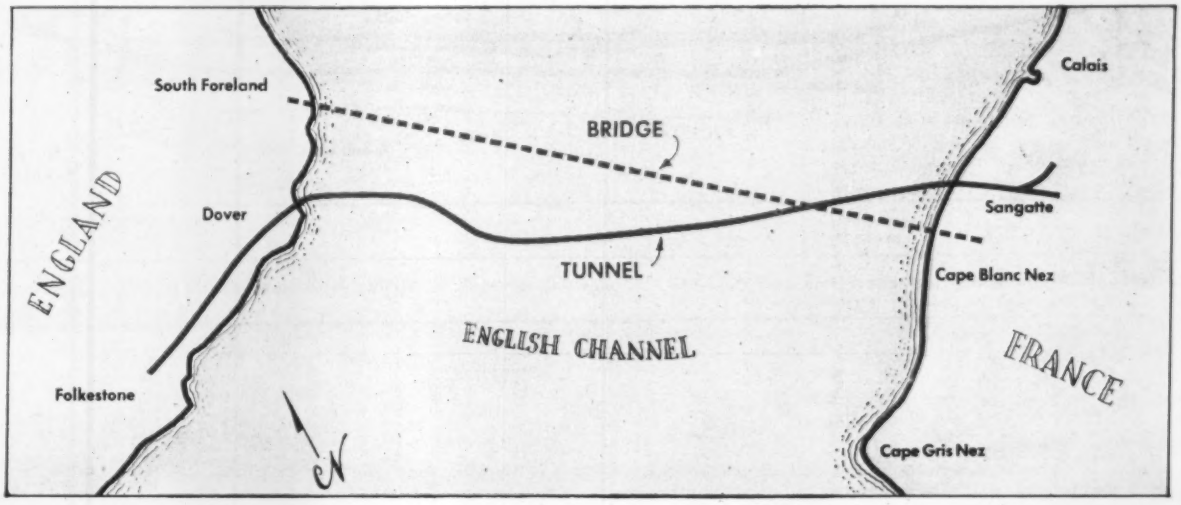




Argument shapes up between backers of bridge and tunnel across the Straits of Dover as . . .

British, French Study Channel Link

A new and significant development in almost 160 years of attempts to finance and build a transport structure across the English Channel between Great Britain and France occurred last week.

For the first time, Cabinet officials, the ministers of transport of the two governments have joined in cooperative action to study the data and sift the claims of rival private groups.

One group has proposed two single-track rail tunnels, the other a combination rail and highway bridge. Committees are being formed to study the important facets of both proposals.

The cost of twin electric railway tunnels is estimated at $294-million including tracks and terminal facilities. The bridge, carrying two rail lines plus five lanes of vehicular traffic, would cost $596 million including terminals, lighting, and navigational beacons.

Each group is convinced that its proposal provides the better solution to the channel link problem and that the competing project has no chance of getting French and British government approval. Claims and counterclaims of the two groups concentrate mainly on cost, capacity, tolls and financing.

Bridge supporters argue that for twice the cost of a tunnel, they offer three times as much capacity—6,000 vehicles per hour in the more heavily traveled direction compared to 1,800 vehicles per hour in each direction for the tunnel. Besides, they contend, the inconvenience of carrying autos and trucks piggy-back and of employing only electric traction, as required by the tunnel plan, would be avoided.

Tunnel backers maintain that their capacity would be adequate for present needs and that they could eventually double the flow by perfecting loading and handling techniques. They assert that the bridge group overestimates cross-channel traffic requirements and would not realize enough revenue to pay off the tremendous investment.

Advocates of the bridge claim that its advantages over a tunnel include elimination of the ventilation problem, providing a direct crossing for vehicular traffic plus ability to accommodate all types of locomotives and the largest trucks.

A bridge would have its drawbacks, however, including the hazards of high wind and fog. Its backers claim that the former can be overcome by deflectors that would reduce wind velocity to that ordinarily encountered on a highway and that powerful lights could cut through the fog, especially since the bridge would be far enough off the water to avoid the thick surface layer.

The danger to navigation is also cited and, while bridge proponents maintain that adequate beacons would warn off shipping and damage to both bridge and vessels could be prevented by mounting booms on bridge piers, the opposition contends that the real danger is in increased occurrences of collisions between ships maneuvering to avoid the superstructure.

Both groups have stated that the entire capital for their projects would be raised privately. The tunnel's financial backers in Britain, France and this country have been named while the younger bridge group has only disclosed names of three nationalized banks in France as possible investors.

Detractors of the bridge proposal doubt that its proponents will be able to raise the entire $596 million in international money markets and claim they will have to seek government help.

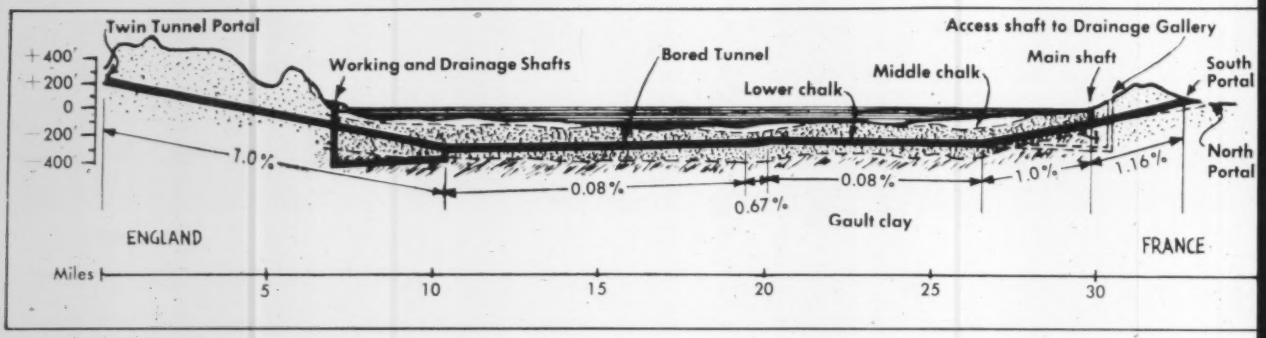
At any rate, tolls for either type of permanent link will run about 30% less than present air and ferry services for cars and passengers and 50% lower for freight shipments. Travel time from London to Paris will be cut down from five to three hours.

For all the dispute over the type of crossing it has been taken generally for granted that either a bridge or a tunnel is technically feasible, although admittedly difficult.

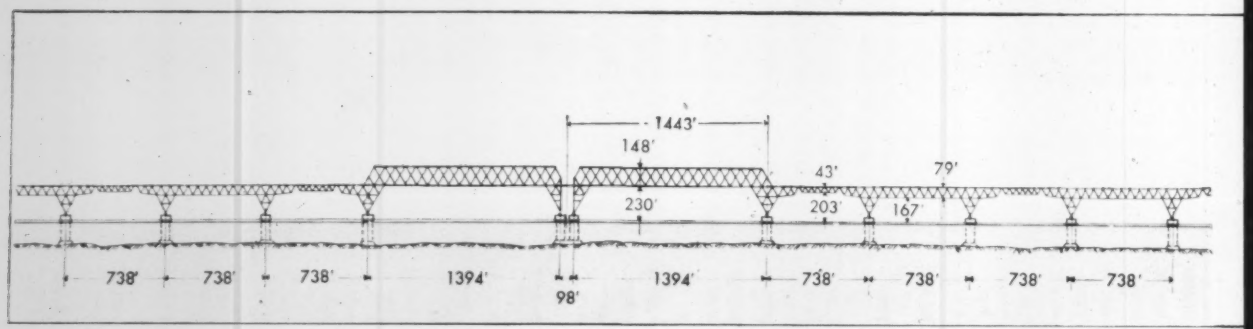
The Channel Tunnel Study Group has narrowed a number of possibilities to one—a bored twin-tube electric railway tunnel separated by a smaller service corridor. While plausible and no more expensive than a bored tunnel, laying of an immersed tunnel would be complicated by the uneven channel bottom and the difficulties of working in the rough waters of the Straits of Dover. Under the circumstances, the bored tunnel is thought to involve less risk.

(Please turn the page)

. . . Tunnel plans vs. bridge plans



TUNNEL PLAN calls for twin railway tubes bored 23 miles through the lower chalk, joining land tunnels at each end.



BRIDGE PLAN proposes construction of a 20.5-mile-long Warren truss structure with 10 large navigational passages.

A bored road tunnel would be comparable in cost to the railway project but would require a tremendous ventilating system. Moreover, its capacity would be half the rail tunnel's.

The most popular tunnel scheme includes tubes of 21-ft-dia with an 11-ft-dia service tunnel between to facilitate construction and maintenance and provide drainage. Cross passages would connect this central corridor to the main tunnels so that ventilation would be provided by the piston action of trains entering the tubes from either end. Constant replenishment of fresh air through the length of the tunnel and in the cross passages would occur, making mechanical ventilating equipment necessary only to reduce the temperature in the tunnel during maximum load periods, engineers claim.

The physical and mechanical characteristics of the stratum of lower chalk immediately below the channel bed are particularly favorable for boring operations. This material is uniform, free of faults and fissures, nearly impervious, and easy to work.

Methods of boring the tubes will be left to contractors eventually awarded the work. However, from tests on borehole samples it has been calculated that boring machines could maintain an average rate of progress for each railway tunnel—with an outside diameter of 23 ft 10 in.—of 1,475 ft per month.

The service tunnel would be bored at some distance ahead of the main tunnels allowing constant testing to anticipate difficulties.

While no serious moisture leaks are expected, water-bearing fissures or weaker areas could be grouted as the tunnel progresses.

Excavated material would be crushed and mixed with water then pumped out through the bored shafts or directly into the channel through vertical boreholes.

Although engineers believe the lower chalk does not require support to maintain integrity of the tunnel walls, a permanent concrete lining would be installed to prevent deterioration and protect electrical equipment from minor leakage. The lining would be installed by specially designed units moving on rails that would mount forms, mix concrete and apply it with pumps.

Boring of the two tubes is estimated to require five years.

The slightly inclined portion through the lower chalk under the channel is 23 miles and will connect with a 7-mile tunnel on the English side, a 3-mile one on the French side. A 9-mile open approach is necessary in England to set the portal behind the cliffs of Dover in an area suitable for terminal facilities. On the opposite side of the channel, near Calais, the open approach will be only 1¼ miles.

Employing modern signaling techniques, a train could enter each end of the tunnel every five minutes and travel as fast as 87 mph. Loops will be provided at either end to permit continuous operation of shuttles without turning around.

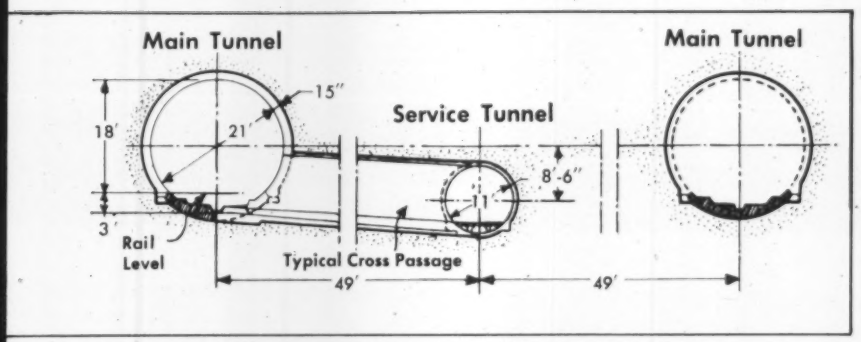
While through trains will operate at maximum speeds, shuttle trains will travel at about 60 mph. At each terminal, cars will be driven onto trains from platforms and passengers will remain in their vehicles for the channel crossing.

Capacity of the double-decked trains will be 300 automobiles and loading time 12 min, unloading time 4½ min. The entire journey will take 50 min of which 33 min will be spent in the tunnel. Larger vehicles will be handled similarly to automobiles but will be loaded on special trains from the end.

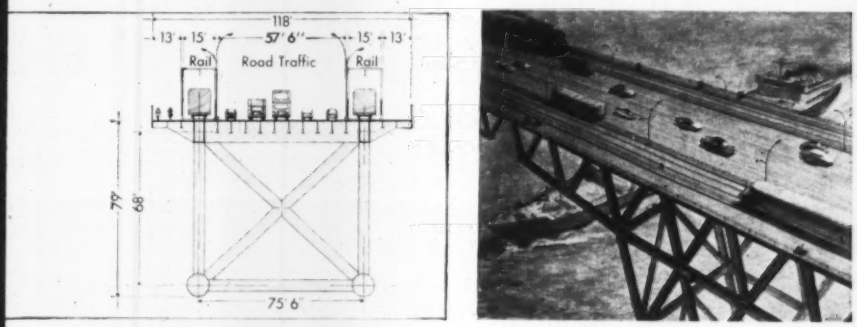
The backers of the bridge link propose a 20.5-mile structure made up of Warren truss spans that would range in length from 738 ft to 1,394 ft.

To stretch across the Pas-de-Calais, the bridge needs 120 spans 738 ft long, plus 10 others nearly twice that long, to provide clearance for safe ship passage in bad weather. That means 164 massive piers to be built in deep water and 880,000 tons of steel welded into prefabricated span sections to be floated into the channel and erected on the piers.

Planners of a bridge over the channel decided on Warren truss construction to give them the rigidity they need to carry two railroad tracks. In their design the spans are made up of two main



TWIN RAILWAY TUBES would be connected to central service tunnel.



BRIDGE DECK, 118 ft wide would carry two rail lines plus five auto lanes.

sections spaced 75.5 ft c-c. Each carries a railroad track. Between them lies a steel-concrete deck for five vehicle lanes.

The deck overhangs the main girder on either side for bicycle and motorcycle paths, bringing the deck width to 118 ft. The deck, 3 to 5 in. of concrete over ⅝ in. steel plate, contributes to cross-stiffening along with transverse members. Long slat-like wind breaks along the length of the bridge protect traffic from high channel winds.

Standard span sections (of which there will be 60) consist of a 1,182-ft deck truss unit cantilevered out 222 ft on either side of piers spaced 738 feet apart. Suspended spans 294 ft long will link adjoining units. Truss depth for the central part of the cantilever span sections is 79 ft and the clearance under them 167 ft above high channel level.

For the 10 long spans, the prefabricated unit is 1,616 ft long, since in addition to the 1,394-ft between-piers span there is a 222-ft cantilever section at one end to link up with the adjoining span. Because the long spans were provided to give safe passage in rough channel weather along the more-traveled maritime routes, clearance under them is 230 ft, 23 ft higher than the Queen Mary's mast, highest now at sea. The additional clearance is obtained without changing the height of the deck, but by placing it at the lower chord level. Truss depth for the long spans is 148 ft.

For the most part, the design calls for tubular welded steel truss elements. But rectangular box beams are specified for elements subject to local bending. All elements will be prefabricated and stress-relieved at the factory.

To bring in this vast construction job in a reasonable time (the bridge's proponents say it would be in operation four-and-a-half years after the detail design is finished), the project calls for prefabricated reinforced-concrete pier elements as well as prefabricated spans. Piers will be made up of reinforced-concrete rings cast in drydocks, then floated out to position and sunk using DeLong type platforms.

Alternate projects for a bored and immersed tube tunnel have been on the desks of government officials since the spring of 1960 (ENR Mar. 31, 1960, p. 25) when they were submitted by a French-British-U. S. Channel Study group (British Channel Study Co., Suez Financial Co., French Channel Co., and Technical Studies, Inc., a U. S. combine). These projects, supported by exhaustive technical and economic studies, were the only ones under consideration until a competing group presented plans for a bridge (ENR Apr. 14, 1960, p. 30).

Behind this latter proposal are three French nationalized banks; steel, oil and trucking interests; and industrial and construction firms all grouped in the Societe d'Etude du Pont sur la Manche. A British bridge group is being established to work with the French.

Study Urges Streamlined Mississippi Road System

Plans to streamline state and county highway systems and to overhaul their financing for a 20-year period are recommended in a study made for the Mississippi Legislative Highway Planning Committee.

The Automotive Safety Foundation study shows that the state will have an annual deficit of $8 million over the next 20 years if the present set-up continues. The recommendations, however, will cut this anticipated deficit to $5.2 million.

The study recommends limiting the 10,400-mile state system to 6,500 miles. Under this plan, the state highways will require $66.5 million annually. With its present system, they need $85.4 million annually and they have an estimated annual revenue of only $61.3 million.

The study also recommends redesignating state-aid roads. Most of the 4,000 miles stripped from the state system will be converted into state-aid roads. And as a counterbalance, some of the present 11,656 miles of state-aid roads will be transferred to the various counties.

Under the reorganized program the county road system will need $58.6 million annually, instead of $42.8 million. And the city street system will need $17.2 million annually, instead of $14.1 million.

BuRec Hires Surveyors For Western Power Lines

The Bureau of Reclamation has negotiated contracts totalling $1.45 million with six private firms for surveying routes for power lines from Colorado River Project dams to metropolitan markets.

Bureau forces customarily do this work, but private companies were hired to avoid delays that heavy snows in the mountainous area would cause.

Much of the nearly 1,000 miles of lines will be in rugged, nearly inaccessible country. The engineers will use aerial photography, helicopter transportation, and electronic distance measuring equipment to aid the work. The lines will distribute power from Glen Canyon Dam on the Colorado River in Arizona, Flaming Gorge Dam on the Green River in Utah, and the Curecanti Unit on the Gunnison River in Colorado.

Engineering companies that have the contracts are: Desert Sun Engineering Corp., Phoenix; Clair A. Hill and Associates, Redding, Calif.; Continental Engineers Inc., Denver; Aero Services Corp., Western, Salt Lake City; Jack Ammann, Inc., San Antonio; and Limbaugh Engineering, Inc., Albuquerque.

Paradise Stack Reaches the Top

Workmen 600 ft above the ground put the finishing touches on the first of two smokestacks for the Tennessee Valley Authority's Paradise Steam Plant. Eight months under construction, the reinforced concrete stack tapers from 54 ft at the bottom to 28½ ft at the top. Its neighboring stack will go on the base already prepared for it, shown on the left of the picture above.

The stacks will serve two turbine generators, each with a capacity of 650,000 kw. In the background, steel work for the first unit is completed and the boiler about one-third installed. Steel work for the second unit is about 20% along. The first unit will be fired up in about a year.

Custodis Construction Co., Inc., of Chicago, is building the stacks under a construction contract for $482,000. Foundations for the stacks go down 37 ft to bedrock.

Sewer Study Spurs Bond Issue

The City Council of Eugene, Ore. (pop. 50,000), has heard that their sewer system is poorly designed, poorly built and poorly maintained.

They got the news from a comprehensive sewer study made for them by Cornell, Howland, Hayes & Merryfield, consulting engineers of Corvallis, Ore. The Council will use the study as the basis for placing an $11.5-million bond issue before the voters next spring.

Their problem parallels that of many cities. Their sewer system evolved somewhat haphazardly as the city grew in the Willamette River Basin. The sewers in the oldest part of the city—about 18% of the total—carry both sanitary and storm drainage, which now need to be separated to prevent recurring floods in the treatment plant. All sewers built before 1920 (all of clay tile) now need to be replaced. And many of the newer sewers are too small, too flat or too leaky.

The bond issue will finance replacement or rehabilitation of existing sewers, new sewers and separation of combined sewers. The engineers recommend spreading construction over the next 25 years. If this is done, they estimate that the program can be carried out and bonds retired with no increase in the base sewer-user charge and only a one-mill increase in the tax levy.

Along with an adequate sewer system, bonds will finance an expansion of the maintenance force and equipping it with modern equipment.

Designer,

The consulting engineer and the contractor involved in design and construction of the controversial Khmer-American Friendship Highway in Cambodia have issued comprehensive reports defending the work done on the project.

Last summer, congressional investigators stirred up a storm of charges and countercharges by asserting that the 140-mile highway "is falling apart" (ENR June 29, p. 20).

Not so, says consulting engineer Michael Baker, Jr. of Rochester, Pa. Says the Baker report, "With minor exceptions . . . the highway is in excellent condition." Based on an on-the-spot, mile-by-mile investigation carried out in July and August, the consulting engineer says, "80% of the road is in excellent condition; 13% requires repairs due to lack of maintenance, extreme overloading and flooding; and 7% requires corrective maintenance."

Part of the trouble says Michael Baker, Jr. is caused by "a general lack of maintenance by the Cambodian government throughout the length of the highway. All of the highway is in need of continuous preventive maintenance and the failure to perform such maintenance poses a continuing threat to its satisfactory performance."

The Baker report also asserts that, "Serious overloading has occurred due to the development of the timber industry. Loads up to 460% of the 18,000-lb design axle load are common." Says Mr. Baker, "It is strongly recommended that load restrictions be established for the highway and that such restrictions be rigidly enforced. No flexible pavement can withstand the abuse of up to 460% overloading."

"Flooding, due to excessive rainfall and lack of maintenance of drainage ditches and structures, has occurred in certain sections," asserts the Baker report. (Pictures accompanying the report show numerous silted and blocked drainage ditches; farmers are even growing rice in some of the ditches.)

A slide did occur in one mountainous section. Says Michael Baker, Jr., "The slide area affects 150 yd along the highway, and is not unusual in mountainous areas. The road has never been closed because of the slide condition."

Most of the pavement distress developed in "critical areas" in which laterite base course was substituted for the crushed stone originally specified. Says Michael Baker, Jr., "The use of this material was the result of pressure . . . to develop a cheap substitute for stone, which was expensive because of the long hauls from the two known sources. . . . All parties acepted the fact that a risk was involved in the use of laterite in

Contractor Defend Cambodia Road

the base course and the engineer brought these matters to the attention of all parties at the time the laterite formula was recommended."

The Baker report says three specific items were pointed out as important in the use of this substitute material: "control of materials and construction; protection of the base from water; and maintenance after construction."

With regard to construction control, Michael Baker, Jr. says, "Although records showing exact construction methods are not available, the method used was described by people familiar with the project and the operation is considered quite satisfactory."

The effect of water was apparently disastrous. Says Mr. Baker, "In the flooded areas there is almost complete destruction of the pavement through saturation of the base course."

An engineering field investigation of the highway was made on behalf of contractor, Dougherty Overseas, Inc., New York City, by Ralph Fadum, director of the School of Civil Engineering, North Carolina State University; Prof. C. R. McCullough, director of highway research, N. C. State University; and J. H. Lucas, professor emeritus of highways, Georgia Institute of Technology.

Upon release of the report, A. L. Dougherty, president of Dougherty Overseas, Inc., stated: "The professional report by Professors Fadum, McCullough and Lucas should once and for all clear the air of untruths, distortions and exaggerations concerning the Khmer-American Friendship Highway."

The report of the three engineers concludes: "No evidence was discovered to indicate that faulty construction procedures were employed in the construction of the highway. At all locations that were investigated in detail, the consistency of the base and subbase was firm, indicating that good compaction was obtained. The thickness of the base and subbase, where measured conformed to or was greater than that specified. Furthermore, the thickness of the asphalt surface was within reasonable and accepted tolerance limits of the specified thickness.

"A study of the correspondence furnished the party by the contractor leaves no doubt that the work of the contractor was inspected and under the direct control of the engineer—which is normal and accepted practice."

The investigators found that substantially all of the failures occurred within the so-called "calculated risk" area—the area where a laterite-sandstone mixture was used in lieu of a crushed stone base material.

The failures in this area, the group said, are a consequence of these factors:

- Presence of soils throughout this section having very unfavorable qualities for highway construction purposes.
- Poor drainage resulting from the low grade lines that were established in many instances in this section.

Coupled with these conditions, the investigators found evidence that the highway has been loaded above design load and that adequate and continuing maintenance has not been carried out (particularly ditch and shoulder maintenance).

The investigators said that the use of laterite was recognized by all concerned as a risk. Much time, money and effort had been spent in trying to find nearby sources of base course material in the form of gravel or hard rock suitable for crushing. These efforts proved largely unsuccessful.

"Furthermore," the report continues, "research by the engineer revealed that laterite had been used successfully for this purpose in other similar parts of the world. Additionally, the contractor had maintained traffic during the rainy season of 1958 over about 21 miles of roadway surface with about 4 in. of laterite.

"By using laterite available in the proximity of the section in question, the length of haul was reduced to about 10% of that which would have been required had the nearest source of crushed sandstone been used. The decision to use locally available laterite permitted the completion of construction on schedule and promised to effect significant savings in the cost of construction.

"In consideration of these factors, the decision to assume a calculated risk by using laterite for the subbase course in the section . . . would appear to be understandable and justified."

The Bureau of Public Roads, at the request of International Cooperation Administration (ICA), is making its own inquiry to determine why the section of the road involved failed and what remedial steps must be taken. Bureau field men also are trying to keep the road passable during the rainy season. The Bureau's tests and findings are not expected to be completed until next spring.

ICA and the State Department then must decide who is responsible for the road's failure and what, if any, action is to be taken against them.

World War II Chief of Army Engineers . . .

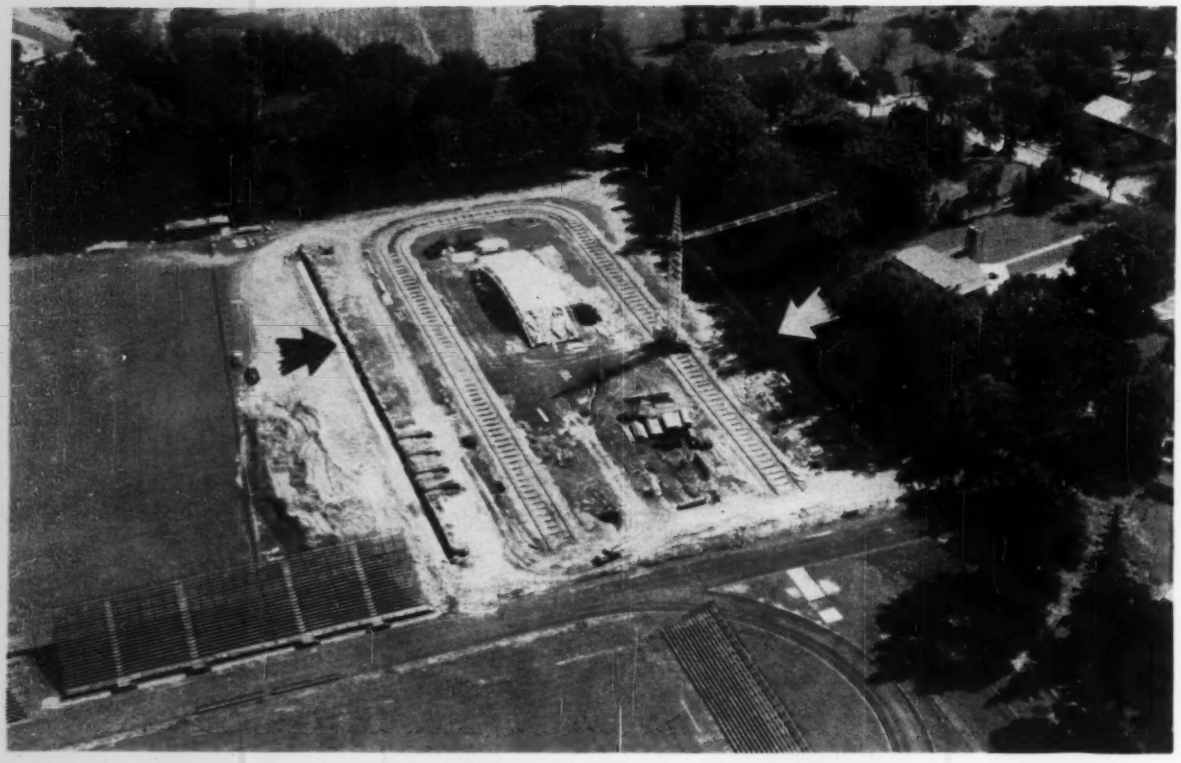
Lt. Gen. Eugene Reybold Dies

Lt. Gen. Eugene Reybold, 77, who was Chief of Engineers, U. S. Army during World War II, from 1941 to 1945, died last week after a six-week illness. Following his retirement from military service, he served, from 1950 to 1956, as executive vice-president of the American Road Builders Association.

General Reybold was the only non-West Point graduate ever to be appointed Chief of Engineers, and was the first Chief of Engineers to attain the rank of lieutenant general. Although he joined the U. S. Engineer Department as a civilian following his graduation in civil engineering from Delaware College in 1903, his military service began in the Coast Artillery in 1908 as a second lieutenant. He did not transfer to the Corps of Engineers until 1926, but thereafter for 15 years he held many important river and harbor posts throughout the country.

General Reybold was District Engineer at Buffalo in charge of work on Lakes Erie and Huron and on the Niagara and St. Lawrence rivers; then District Engineer at Wilmington, N. C.; next, District Engineer at Memphis, where his work during the great flood on the Mississippi in 1937 drew nationwide praise. Finally, he was Division Engineer of the Southwestern Division at Little Rock. For a year prior to his appointment as Chief of Engineers, General Reybold was in Washington as assistant chief of staff of the Supply Division of the War Department General Staff.

Lt. Gen. Eugene Reybold



Footings (arrows) are in place for an arched building, to be erected with a tower crane.

Dartmouth Builds Precast Fieldhouse

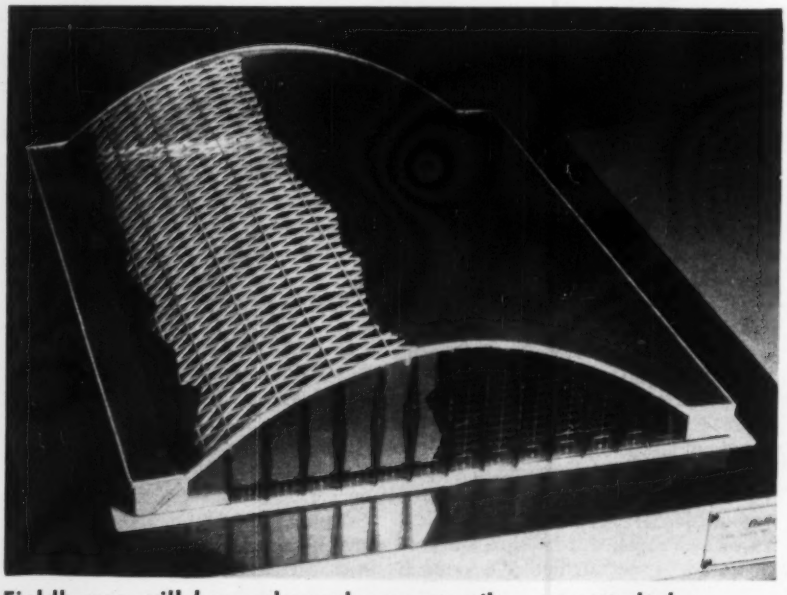
A novel method of construction will be used for a concrete arch fieldhouse being built at Dartmouth College. Designed by Pier Luigi Nervi, of Rome, Italy, the barrel arched roof will be formed with precast concrete pans, to be erected first, and supporting ribs, to be cast in place later.

The arch spans 219 ft with a rise of 59 ft. It will be supported on concrete A-frames that transmit the thrust to a continuous footing on glacial silt. The footings and A-frames have been completed.

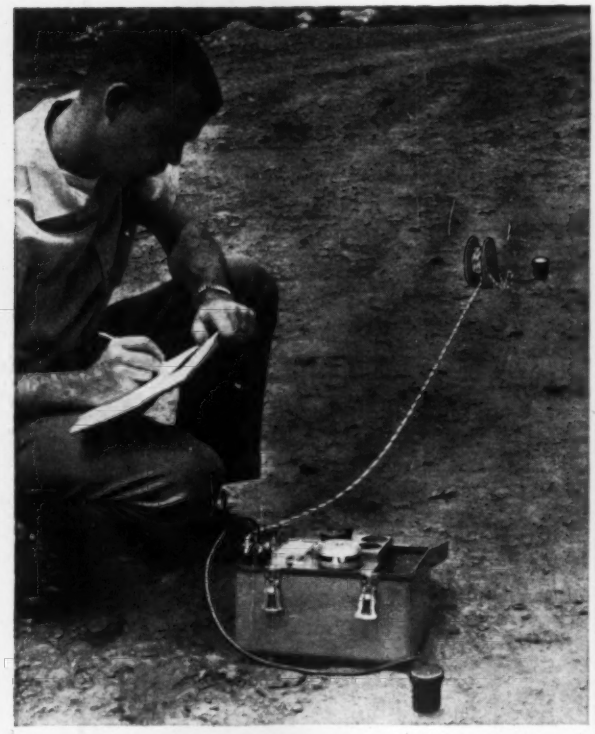
To facilitate construction, the general contractor, Wexler Construction Co., Newton Highlands, Mass., plans to use a tower crane. For the purpose, he has laid two sets of tracks connected to form a U, inside the site. The legs of the U are parallel to the footings. These tracks also will be used later for rolling the moving falsework for the arch along the 360-ft length of the building. Main elements of this falsework will be four, three-hinged trussed steel arches adjusted with jacks. These arches will be spaced 9 ft 4 in. c-c.

The precast pans, triangular and diamond shaped, will be laid inverted on the falsework. The top of the pans, 4 in. thick, will serve as the roof deck. Longitudinal bracing and diagonal arch ribs will be formed by placing concrete between the pans. Wexler now is building brick and plaster molds for the precast pans on a covered arched platform near the center of the site (see picture above).

Campbell and Aldrich, architects, of Boston, and John H. Minnich, consulting engineer of Hanover, N. H., are associated with Mr. Nervi on the design.



Fieldhouse will have skewed concrete ribs, precast deck.



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Around the World . . .

• **Smoke sewers**—The way to handle some of the more noxious industrial air contaminants might be smoke sewers, says H. E. Landsberg, director of the U. S. Weather Bureau's office of climatology. Some European smelters have used them for years, he says.

• **Road link**—An 85-mile stretch in southern Yugoslavia from Grdelica to Skoplje closes the last big gap in the 740-mile Brotherhood and Unity Highway. A four-mile section, south of Skoplje, will be paved next year. The trans-Yugoslav road, which links Italy and Austria with Greece, was started in 1950. The U. S. contributed $34 million for Yugoslavia's road system.

• **Minuteman silo**—The Air Force, at site A-2 near Belt, Mont., received its first completed underground Minuteman missile silo. Further work includes paving the area around the silo, and installing underground cables and missile firing electronic equipment. Missiles are scheduled to be put in by next summer.

• **Round Butte bid call**—Portland General Electric Co. will take bids January 16 on a 440-ft-high compacted rockfill dam, a gated spillway intake structure, a steel- and concrete-lined power tunnel, a semi-outdoor powerhouse, fish passing facilities and installation of owner-furnished equipment for the Round Butte hydro project on the Deschutes River in Oregon. Estimated over-all cost of the project is $68 million.

• **Atomic power**—The world's largest atomic power plants are taking shape in England. At Hinkley Point, the first 500,000-kw atomic plant is near completion. Some 200 miles away, the most powerful and most compact of Britain's seven commercial atomic plants is under construction at Sizewell. When completed in 1966, this plant will have a generating capacity of 580,000 kw.

• **Promotion for Coulee**—Power output at Grand Coulee Dam on the Columbia River can be nearly tripled to 5.5 million kw if Canada goes along with the U. S. on the Columbia River Treaty. In this light, the Bureau of Reclamation is considering abandoning a 10-year-old plan for a third powerhouse that would add only 1.5 million kw.

• **Revenues rise**—The Bureau of Public Roads estimates that the 1961 state highway-user tax revenues will total $5.6 billion. (This is up 4% over the 1960 figure of $5.3 billion). State motor-fuel tax receipts will account for $3.5 billion, and motor-vehicle registration fees for $1.6 billion.

• **Experimental road**—Spain's first experimental road, a five-mile section of the Madrid-Barcelona road, will evaluate paving materials under actual road-use conditions. It will include 1.9 miles of asphalt, 1.9 miles of concrete and 1.2 miles of prestressed concrete pavement. The project will cost $1.5 million.

• **Eating abroad**—Treadway Inns Corp., which has had a half century of experience in feeding and housing the traveling public is readying plans to do the same for construction personnel overseas.

• **Northern heights**—A $20-million hotel, featuring a cylindrical tower 38 stories high, will go up in downtown Montreal. Construction is scheduled to start before year's end, with completion in 1963.

• **Radome houses giant antenna**—A 210-ft-dia by 160-ft-high, air-supported radome in Andover, Me., will house a 250-ton space-communication antenna. The enclosure will be dacron fabric coated with synthetic rubber. Equipment will be assembled in a smaller, temporary air-supported shelter. Birdair Structures, Inc., Buffalo, N.Y., is supplying both shelters for about $1 million.

• **Airport aid aides**—The Airport Service, which aims at effective administration of the Federal-Aid Airports Program, has been established by the Federal Aviation Agency. Cole H. Morrow, former president of the Racine, Wis., Commercial Airport Corp., is the director.

• **Access for an aqueduct**—Bulldozers have begun chewing access roads in the sides of California's rugged Tehachapi Mountains moving the first earth for the Feather River Aqueduct. The big pipe will bring water from the Feather River area in northern California to the parched southern part of the state. First tunneling and pipeline contracts will be let in 1964.

A. A. Raymond Award Goes To Northwestern Professor

Robert L. Kondner, assistant professor of civil engineering at the Technological Institute at Northwestern University, Evanston, Ill., has won the Alfred A. Raymond Award of $1,000 for 1961.

The title of Mr. Kondner's paper is, "Bearing Capacity of Friction Pile Groups in Cohesive Soil."

Mr. Kondner received his master's degree in 1954 and his doctorate in 1961 from Johns Hopkins University, Baltimore. He was on the faculty of Johns Hopkins from 1954 to 1960.

The Alfred A. Raymond Award has been given annually for an outstanding paper on foundations of structures and is sponsored by the Raymond Concrete Pile Division of Raymond International Inc., New York City.

The panel of judges who made the selection consisted of Frank A. Marston of Metcalf & Eddy, Boston; W. W. Moore of Dames & Moore, San Francisco; and Prof. Jorj Osterberg, Northwestern University, Evanston, Ill.

Bridge Redesign Wins Welding Contest Award

K. E. Dumbauld and D. C. Hoffman, of the Ohio State Highway Department, won $3,000 for redesigning a bridge in a way that cut the superstructure cost by 12.7% ($2 per sq ft).

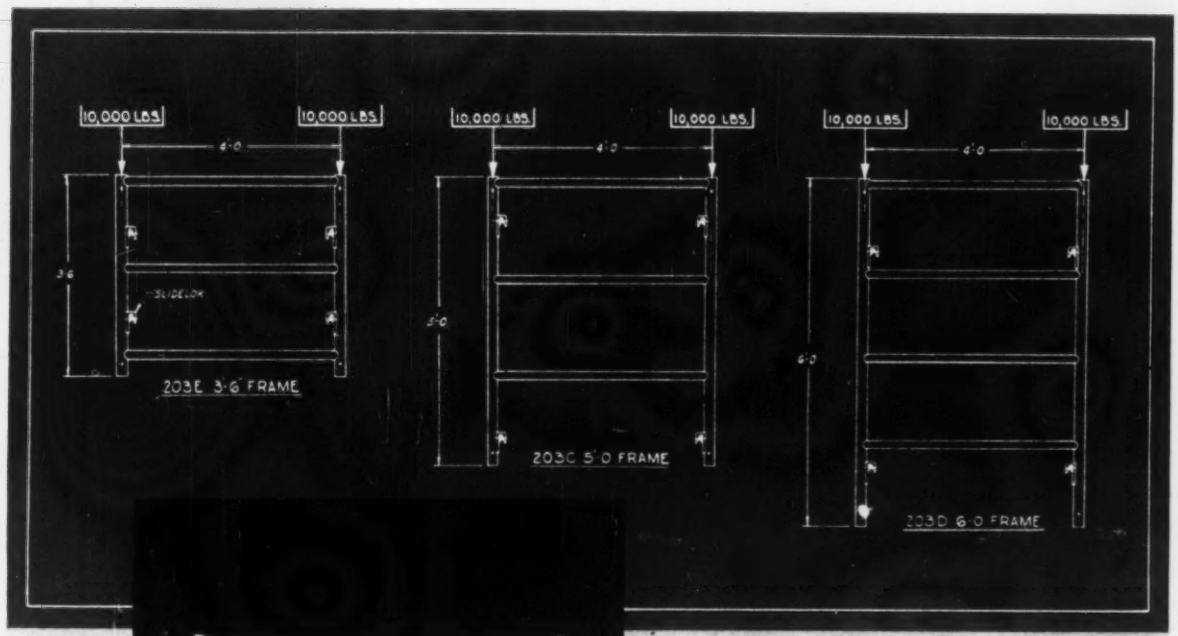
The money was the first award in a $25,000 award program for papers on progress in arc welded design of machines and structures. The James F. Lincoln Arc Welding Foundation of Cleveland, Ohio, sponsored the program.

The prize-winning paper described a five-span, continuous plate-girder bridge with welded field splices and a steel-plate deck topped with asphalt. It was to replace girders with bolted splices and concrete deck.

John F. Orsorn, University of Wisconsin, Madison, Wis., won the $1,500 second award with a paper, "The Renaissance of Steel Dams." It presents figures indicating that material costs of a steel dam would be 75% of those for a concrete dam.

Peter P. Petkoff and Lin Y. Huang, structural engineers with Minoru Yamasaki–Smith, Hinchman & Grylls, Associated Architects and Engineers, Detroit, Mich., won the $1,000 third award.

Their paper described the welded steel framing of the 28-story Michigan Consolidated Gas Co. building in Detroit (ENR Aug. 24, p. 32). They estimate a cost savings of 10% by welding instead of riveting, plus reduction in building height and cuts in the design costs.



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Read about the most important development

A recent Cyclone Fence development promises to revolutionize industrial fencing throughout the United States. After years of vigorous research, and production line debugging, we are manufacturing an aluminum-coated steel fence of such high quality that we are willing to give it the Cyclone name. Nine years of field testing indicate that no other type of fence can economically match Cyclone Aluminum-Coated Fence's combination of corrosion resistance, tensile strength and heat resistance. Yet the price is only slightly above first-quality galvanized steel fence.

FIRE RESISTANCE

In a brush or debris fire, not uncommon along a fence line, temperatures can easily climb to the 1,300° mark. If the fence fabric melts, your property protection goes with it. The steel in Cyclone Aluminum-Coated Fence will not melt at temperatures below 2,850°. Repeated tests have shown that our aluminum-coated fabric can withstand temperatures as high as 1,650° and still retain its protective coating, and 2,000° for brief periods without the destruction of a single strand of wire.

STRENGTH

The steel wire used in Cyclone Aluminum-Coated Fence has a minimum tensile strength of 80,000 psi, and that strength is retained as long as the coating remains intact. What does this strength mean to you? In actual tests, USS Cyclone Aluminum-Coated Fence was rammed by a car traveling at 35 mph. Not a single strand of wire was broken. ■ Buyers must not underestimate the necessity for strength in industrial fence. If you could "fence your fence" to protect it there would be no problems. But fence has to stand alone, and withstand vandals, side-swiping vehicles, and all sorts of mechanical abuse.

Protect it with USS CYCLONE

in the history of property protection fence

CORROSION RESISTANCE

Our Research and Metallurgical people have found accelerated weathering and salt spray tests are misleading, therefore the following data is from actual service records: After 9 years of continuous exposure to a severe industrial atmosphere (Cleveland), Cyclone Aluminum-Coated Fence shows practically no deterioration. Even after 9 years of severe marine exposure, 90% of the surface was free of corrosion.

PRICE

The normal market prices for USS Cyclone Aluminum-Coated Fence are only slightly above prices for galvanized chain link fence. And remember, for this very slight premium you're getting the combination of aluminum and steel that gives you superior corrosion resistance and long lasting strength.

KNOW THE BRAND

Cyclone is a brand name, not a type of fence. When you buy USS Cyclone you're getting a fence that's pre-engineered, prefabricated down to its smallest part. The Cyclone-developed H-Post is built like a steel beam for extra strength; Cyclone gates are sleeve-constructed—not welded—so they can be easily repaired; one-quality, full-weight fabric; deep-set post installations that don't skimp on concrete or steel, and professional installation by long-time Cyclone crewmen who know how to put up a fence to stay. ■ USS Cyclone has sales offices all over the country and a reputation built on the fact that Cyclone is the most widely used property protection fence in the world. Cyclone Fence is backed by the American Steel and Wire Division of United States Steel—a company that will be around tomorrow to live with what it sells today. ■ 69 CYCLONE BRANCH OFFICES. Cyclone has 69 branch offices throughout the country. Which means, wherever you are, we're reasonably close by. Give us a call next time you need fence around your company's property. Check your Yellow Pages under "Fence." For a brochure on new Cyclone Aluminum-Coated Fence, write American Steel and Wire, Rockefeller Building, Cleveland 13, Ohio.

USS and Cyclone are registered trademarks.

Steel For safety, dependability, economy.

USS **American Steel and Wire Division of United States Steel**

All-Welded

By Joseph E. Storch

Where U. S. 1 crosses the Potomac River, southbound from Washington, D. C., a sleek, all welded, steel plate girder bridge now nearing completion will replace a 60-year-old, through truss bridge.

The new structure, properly called the West Highway Bridge, is a sister to the 10-year-old all-riveted East Highway Bridge, which carries U. S. 1 northbound traffic. The pair is known locally as the 14th Street Bridge.

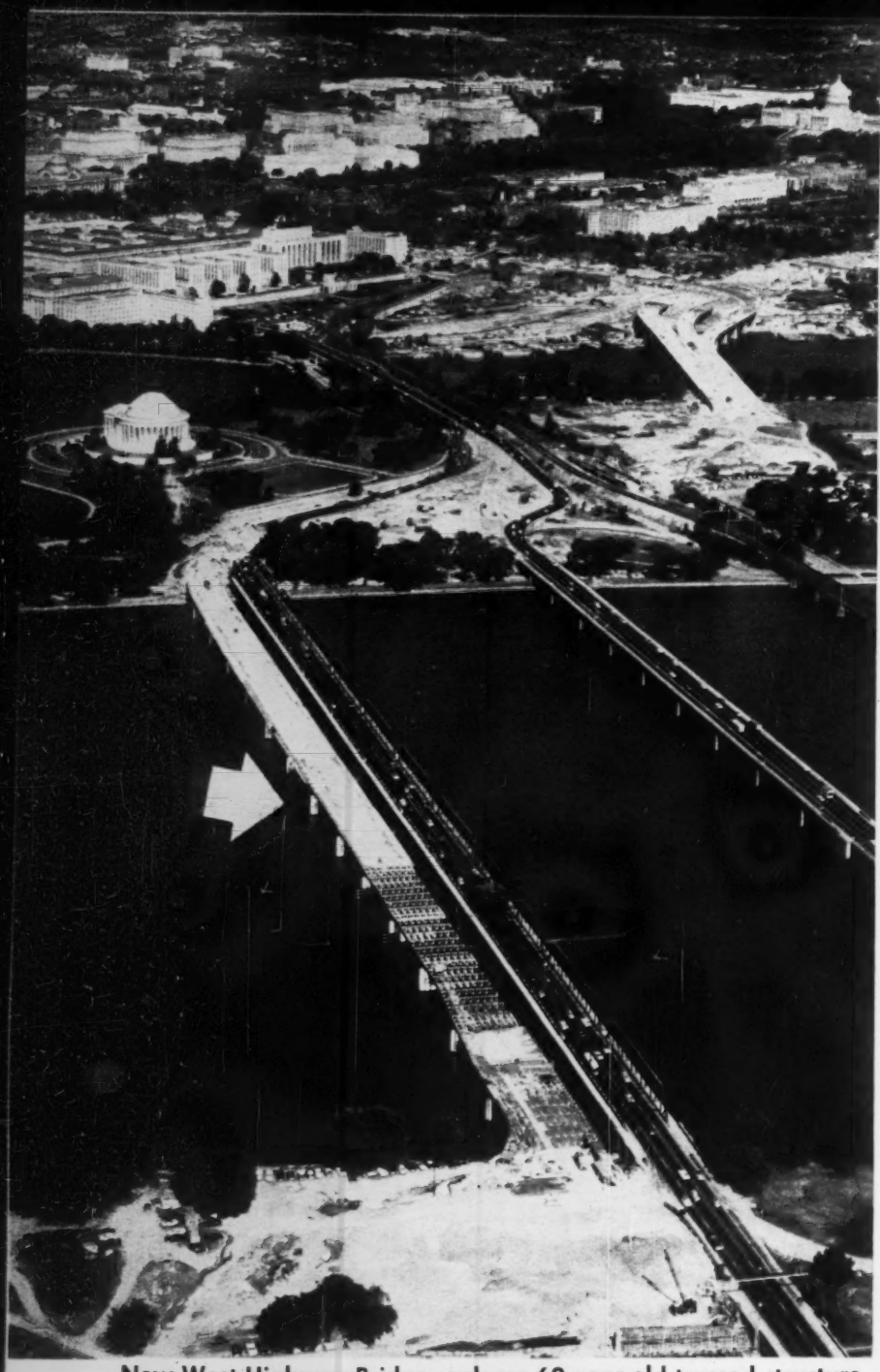
Composite and continuous design help give the new bridge its slim look. And welding plus interior stiffeners on the exterior girders contribute to its smooth appearance.

Probably its most unusual feature resulted from designers' efforts to achieve rigidity where the continuous girders connect to three anchorage piers. Heavy steel frames encased in concrete do the job.

Consulting engineers Howard Needles, Tammen & Bergendoff, Kansas City, Mo., designed the new $2.5-million bridge, a 15-span, 2,265-ft long steel structure that carriers a 4-lane concrete roadway. The superstructure has nine lines of continuous deck girders comprising plate flanges welded to web plates, with welded stiffeners and diaphragm connections.

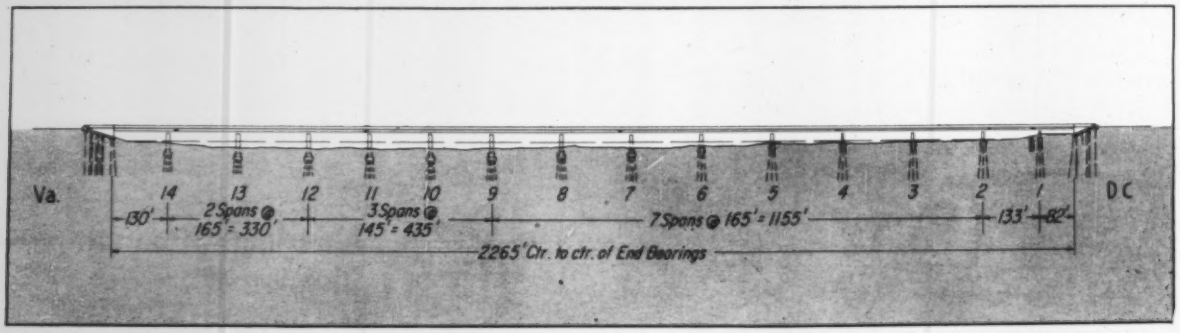
• **Main girder spans**—Designers spaced the 6-ft-deep girders at 7 ft 5 in. centers to form a steel framework 56 ft 6 in. wide that carries a 62 ft, 6-in. roadway. Field-applied studs at the positive moment areas assure composite action.

Exterior lines of girders carry sidewalks on both sides. These girders



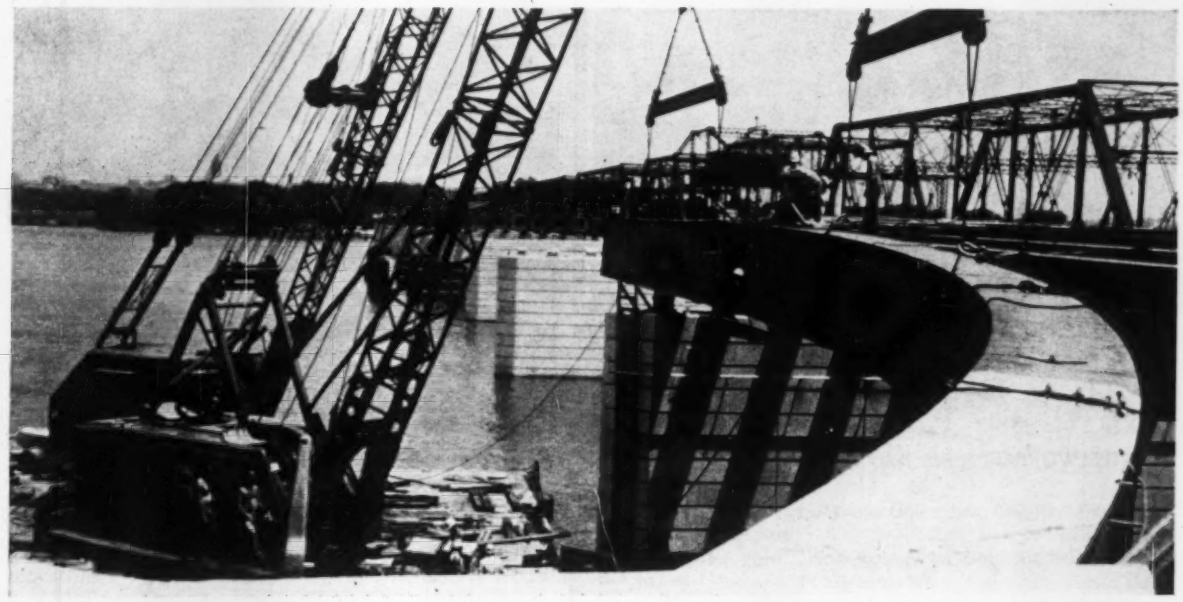
New West Highway Bridge replaces 60-year-old trussed structure.

Mr. Storch, a registered professional engineer, is executive vice president of Schacht Steel Construction, Inc., Hillside, N. J., general contractors for the West Highway Bridge superstructure.



Fifteen spans have seven groups of continuous girder units, with three anchor piers (4, 7, 14).

Steel Bridge Spans the Potomac



Two cranes erect curved, continuous box girder, 160 ft long, at Virginia end of new crossing.

show no stiffeners on the exterior faces. Their lower flange plates are off-set to the inside of the web (see drawing). Field splices of the exterior girders are fully welded across web and flanges. Hinged plate cover doors conceal rollers set between overlapping units to retain the smooth exterior appearance.

Designers placed diaphragms at 20 to 22-ft centers between girders. They are welded full length along the girder stiffeners to provide lateral support and rigidity.

• **Anchorage piers**—Three of the 14 granite-faced, concrete-filled piers are anchorage piers (Nos. 4, 7, 14; see sketch). The substructure contractor, Diamond Construction Co of Savannah, Ga., was required to leave the tops of these piers uncompleted 6 ft below the bearing elevation of the girders that cross them. An elaborate system of bracing and anchoring was required for the plate girders at these points (see drawing). Following the erection of steelwork and the application of all dead-load concrete on the superstructure, the piers were completed.

At each anchor pier, the load from the interior lines of girders over them is carried down by 6-ft high 18WF96 stub columns, bolted to a raised concrete pad set in piertop sinkages. Anchor bolts projecting through the concrete bearing pads connected the bottom of the column base plate to the uncompleted pier. The lower girder flange carries a simple rocker plate, bolted to a steel bearing plate welded to the top of the stub column, allowing for construction stresses, prior to concrete encasement.

Individual plate covered and internally braced cages, measuring 4 ft 5 in. by 7 ft 5 in. in plan, 12 ft deep, were built up of heavy angles, tees, and plate, and set between each pair of interior girders. Cage support legs project 6 ft below girder level to bear on the pier below at the same elevation as the stub columns. Cages are welded into the girders along the stiffeners and across the top girder flanges.

Granite masonry facing was then extended upward to meet the cage plates, forming an open coffin 4 ft 5 in wide by 12 ft deep along the pier, and 3 ft beyond the seven interior girders.

The exterior girders at each end of the anchorage piers bear on fixed shoes. Pier height under these girders is normal height. The exterior girders are tied laterally to the adjacent interior girder by a single steel diaphragm similar to those used at other pier locations.

• **Anchorage Construction**—With two barge-mounted cranes at the anchorage pier and material barges spotted alongside, the erector set all of the interior and exterior end sections of the nine girder lines across the pier. The girders were centered on the stub columns and the anchorage cages between them prevented rotation.

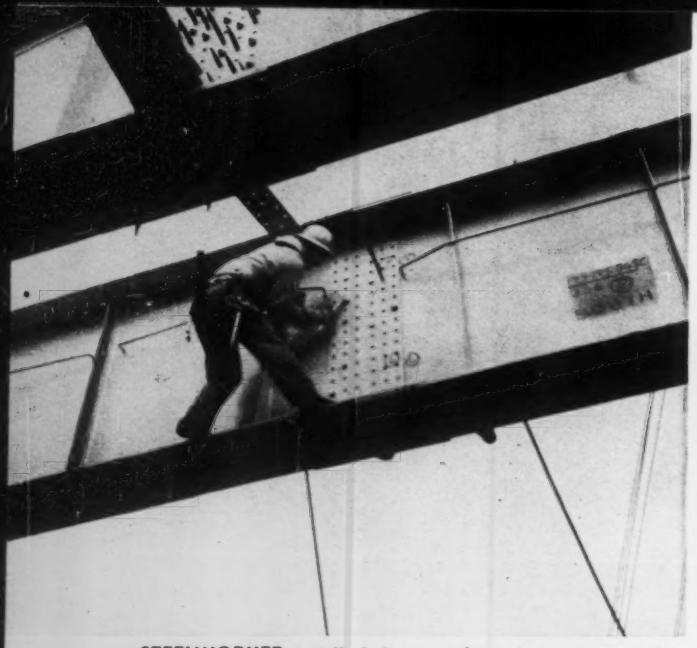
Work began on the side closest to the old truss bridge. The erector first set and braced the two outside lines of interior girders on that side. He then set the exterior girder on that side over its fixed shoe and set the diaphragms in place for rigidity. Erection of the other girders followed in sequence until all nine were in place.

The cranes then moved farther out in the same span to set the next two girder sections on each line to reach the next pier. Each crane first lifted one section of the outside interior girder and held it while steelworkers pinned and bolted temporary splices between the two cranes and back to the first section on the anchorage pier.

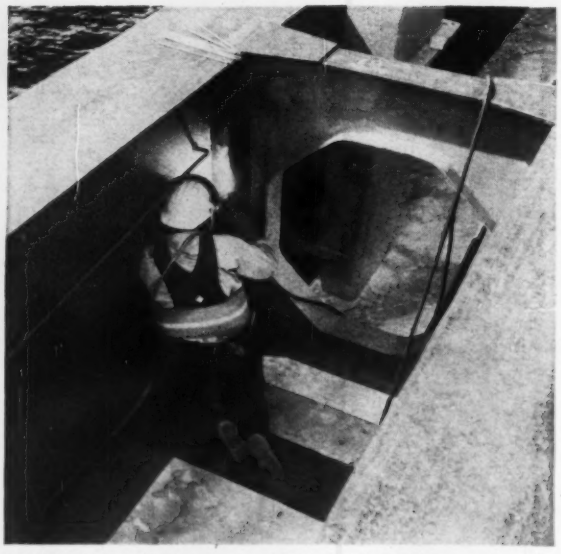
They braced and blocked each girder section on the pier ahead to prevent lateral movement. They then set the two sections of the next interior girder in the same manner, spliced them and set the diaphragms between the two lines.

Reaching across the two lines already set, the cranes placed the exterior girder sections in the same way. The erector maintained horizontal and vertical alignment of the girders by matching and bolting clip angles applied during shop assembly. Other temporary braces were welded to upper and lower flange plates at the splices until crews completed field welding of the splices.

Additional girder lines were set and spliced in the same manner. The contractor then riveted the interior girder splices, set expansion dams and roadway scuppers and completed field welding of diaphragms and exterior girder



STEELWORKER installs bolts to make temporary connection.



WELDER joins diaphragm to adjacent plate girders.

splices. All exterior girder splices were radiographed.

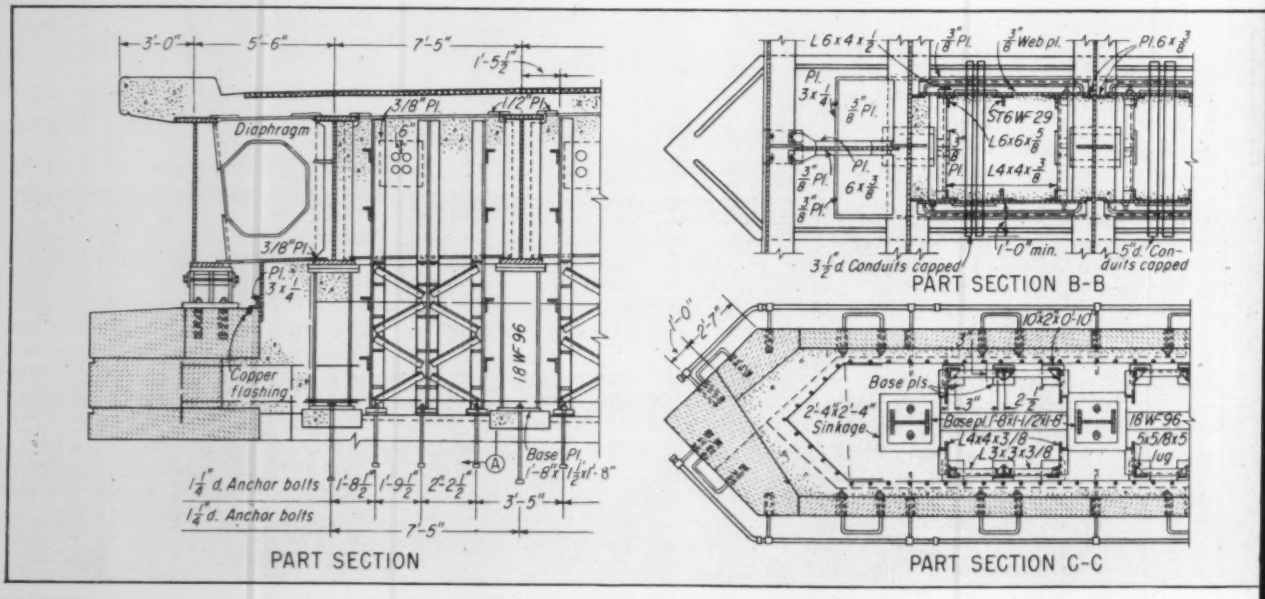
The contractor delayed completion of the anchorage until the concrete deck had been placed for the structural unit concerned. He then placed concrete over the anchorage pier in two 6-ft high lifts. Final surface of this concrete is flush with the rest of the deck. The anchorage cages, girders and stub columns are completely encased in concrete, tying the structure to the pier.

• **Steel fabrication**—Schacht Steel Construction Inc., Hillside, N. J., general contractors for the superstructure, fabricated 21,000 ft of automatically welded plate girders in their shops at Apollo, Pa. There are seven groups of basic continuous span girder units. Beginning at the D. C. abutment, their lengths are 90, 485, 495, 430, 175, 430, and 160 ft.

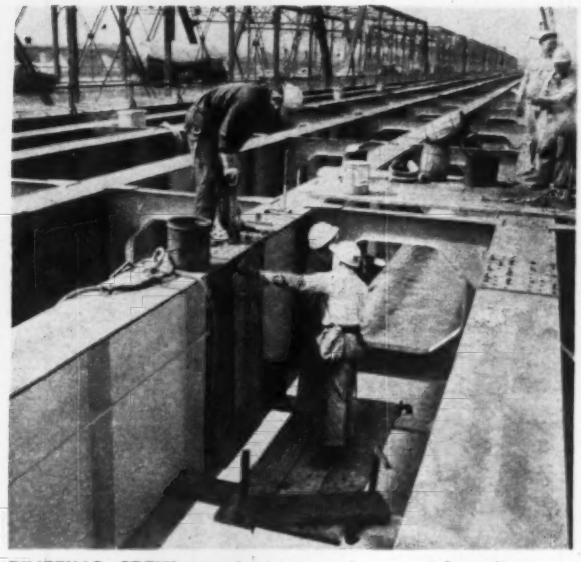
The seven units are carried continuously over the river piers to the abutments, and are supported at their ends on each other, with one end designed as a short cantilever and the other end free. Load is transferred from the free end of a girder unit through a 14-in.-dia, 13-in. long end-toothed roller set across the neutral axis of the cantilever. Corresponding cutouts in the girder ends permit roller clearance and movement of the free end.

Flange thicknesses vary from $\frac{7}{8}$ to $2\frac{1}{4}$ in., 20 in. wide; webs from $\frac{7}{16}$ in. to 1 in. thick, 68 or 70 in. deep. Shop crews welded the flange plates of various thicknesses to length, then spliced the web plates to length and cut them to design cambers. They then assembled the webs and flanges in jigs, rotated the jigs to provide a suitable weld fillet surface and automatically welded them with submerged arc equipment. Stiffeners, bar railings, bearing plates and other details completed the fabrication.

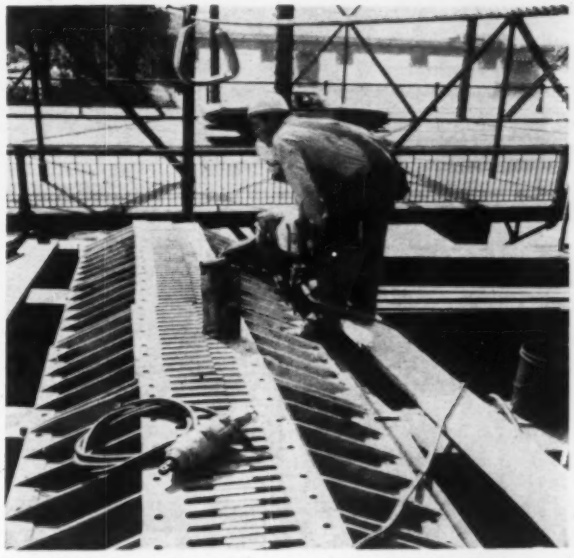
The fabricator assembled girder sections on the shop floor in unit lengths up to 495 ft, reamed them for $\frac{7}{8}$-in. rivets, matchmarked, disassembled and painted them.



ELABORATE system of steel members and plates embedded in concrete assures fixed connection at anchorage pier.



RIVETING CREW puts finishing touches on girder splice.



WORKMEN install finger-type expansion joint in deck.

Schacht fabricated each diaphragm from a solid 7 ft x 6 ft x ⅜-in. steel plate. A pantagraph was used to flame cut an interior octagonal opening in the plate. Each diaphragm has welded flanges on the eight-sided interior perimeter and along the horizontal edges.

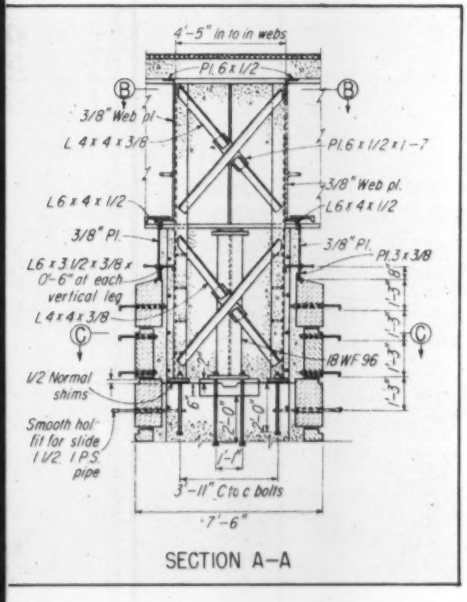
The fabricator shipped the girder sections and diaphragms by rail to a yard on the Anacostia River about 6 miles from the job site. As required for erection sections were loaded on barges and towed to the proper spans.

• **Box girder**—Traffic leaving the bridge on the Virginia side splits into southbound U.S. 1 traffic and westbound traffic for the Mount Vernon Memorial Parkway. Here, the bridge flares out to the west, the width increasing from 62 ft 6 in. to 99 ft 6 in. at the south abutment.

Engineers designed the exterior of the transition section as a continuous, curved box girder. Schacht fabricated it in sections, 100 ft and 60 ft long.

This member spans the Virginia abutment and the last river pier (14), cantilevering 30 ft beyond that pier. The box girder carries the ends of three skewed girders in the widened transition section, as well as the free end of the exterior girder in the adjacent unit.

The erection subcontractor, John F. Beasley Construction Co., Chicago, handled the box girder sections with cranes and welded the field splices in the air.


4'-5" in to in webs
Pl. 6 x 1/2
B
B
3/8" Web pl.
L 4 x 4 x 3/8
Pl. 6 x 1/2 x 1'-7
3/8" Web pl.
L 6 x 4 x 1/2
L 6 x 4 x 1/2
3/8" Pl.
3/8" Pl.
Pl. 3 x 3/8
L 6 x 3 1/2 x 3/8 x 0'-6" at each vertical leg
L 4 x 4 x 3/8
C
C
18 WF 96
1/2 Normal shims
Smooth bolt fit for slide 1 1/2 I.P.S. pipe
3'-11" C to c bolts
7'-6"

SECTION A–A

• **Erection**—Steelworkers began erection of the seven girder units on the D. C. side and worked toward the Virginia abutment. They set the first and shortest unit (90 ft) from the D. C. abutment to slightly beyond the first river pier.

Erection of the second (485-ft) unit was started three spans away from the first atop an anchorage pier (No. 4). Crews erected the unit back toward the cantilevered ends of girders in the first unit, as described previously. Similarly, the third (495-ft) unit was erected from an anchorage pier (No. 7) back to rest on the overhanging ends of the second unit.

Beasley then erected the next three units—430, 175, and 430 ft consecutively. The final 160-ft unit spans from the east river pier (No. 14), which is an anchorage pier, to the Virginia abutment. This unit contains the box girder that was described previously.

Bearings on the piers are of two types: fixed shoes and expansion rollers. The two abutments and piers 2, 3, 5, 6, 9, 11 and 13 have expansion rollers. Piers 1, 8, 10 and 12 have fixed shoes.

A typical expansion roller is a 15-in. dia, 2-ft long smooth steel roller end-toothed into a 2 ft x 2 ft x 3½-in. masonry plate. The girder is carried across the roller by a 2 ft x 2 ft x 2-in. steel plate. Fixed bearings are the conventional pin type, with 4-in. dia pins.

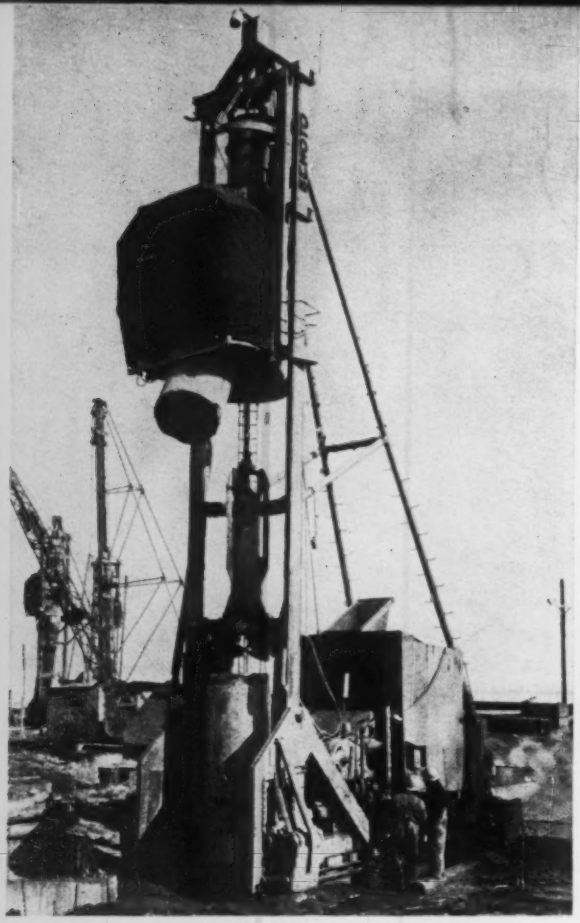
A cast steel finger-type expansion joint lies in the concrete deck above each line where girder units overlap. The contractor cast the deck discontinuously at these locations.

The contractor spliced the individual girder sections in the air in the long river spans.

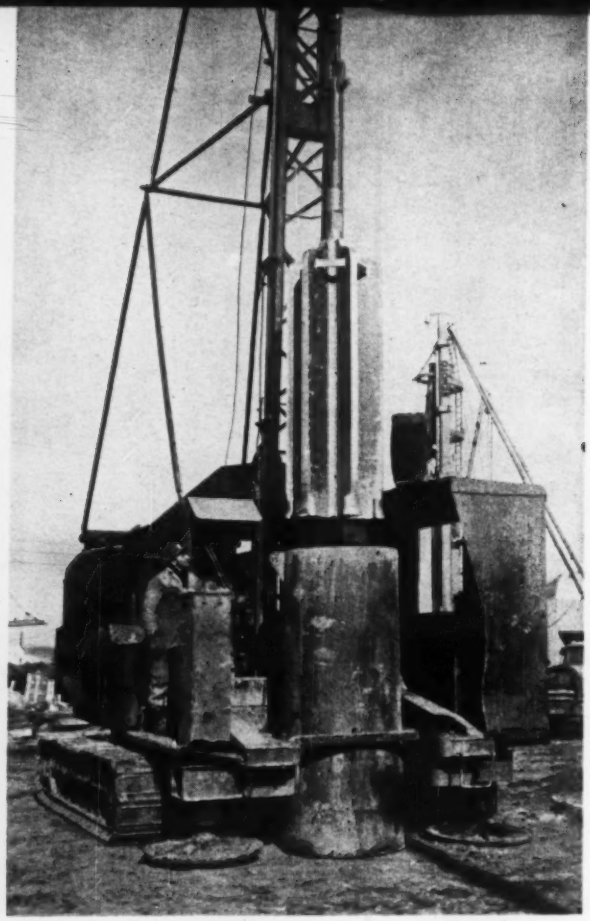
• **Concrete deck**—The contractor cast the reinforced concrete deck in alternate sections from 102 to 230 ft long, with positive movement areas cast ahead of negative areas. Forms were reusable plyform panels on timber frames. Expansion castings bolted to the main girders were cast integrally with the roadway slab.

There were 21 casting sequences required for the concrete deck, with three of these being at the anchorage piers. These were done after the deck was completed for the structural unit concerned.

The bridge is being built for the District of Columbia Department of Highways & Traffic; H. L. Aitken is Director, D. J. O'Bryan, Jr. is project engineer. Project manager for John F. Beasley Co. is Andrew Lytle; for Schacht Steel Construction, Inc., Ralph P. Lawrence.



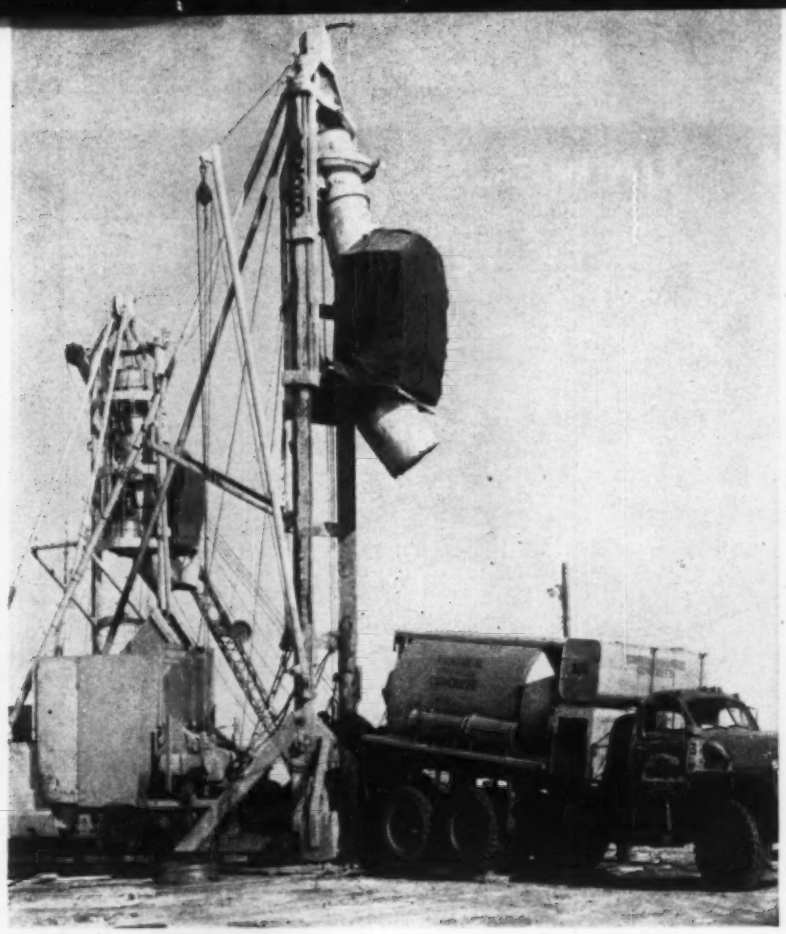
Boring rig drives 39-in.-dia steel casing.



7,000-lb churn-drill bit clears obstructions.

Imported Boring Rigs Complete

Benoto rigs finish last of 600 caissons. Back hoe cleans up the water-logged site.



Concrete is cast through tremie before casings are removed.

Tough Foundation Job

When Canada's National Harbour Board called for bids on a tough foundation job in Montreal, newly formed Petrifond Foundation Co. Ltd. decided it could be done with a novel machine made in France, and won the contract at $1.6 million.

The foundation supports a 1,200 x 70-ft by 240-ft-high grain elevator built on reclaimed land in the St. Lawrence River. Two years ago the riverbed was dredged and rock-filled cribs were set on rock bases (ENR June 18, 1959, p. 73).

Test data revealed difficult site conditions—unstable fill material, large obstructions over 20% of the rock mattress, and water-bearing soil with a high head. Furthermore, displacement piles would develop lateral loads against the cribs.

The foundation has to support six lines of columns, each with 100 columns. Columns are spaced 12-ft apart both ways. The columns, 14 ft high, extend from the foundation slab to the slab at the bottom of the 20-ft-dia silos. National Harbour Board engineers suggested nine piles to carry the 477 to 540-ton load at each column.

Petrifond proposed one caisson, instead of the nine piles under each column. Its bid for 39-in.-dia caissons socketed 42 in. in bedrock was 15% cheaper than the other bids.

Key to the operation was three $200,000 Benoto machines imported from France. These hydraulic, semi-rotary, boring rigs place and remove large diameter casings and can walk and turn on hydraulic jacks in confined spaces.

The contractor placed the first casing in November 1960. Working round-the-clock and through a bitter winter, he finished on schedule this past July.

• **Casings installed**—Powered by 150-hp diesels, the 30-ton machines operated a battery of powerful hydraulic jacks for each of the simultaneous operations of casing advancement. The rig gripped the 20-ft section of heavy-duty, 39-in.-dia steel casing within a collar and oscillated it in a horizontal plane while applying downward force. Additional casing sections were added securely and quickly.

Hardened steel cutting heads on the bottom sections were continuously rebuilt with stellite, an alloy of chromium, cobalt and tungsten, and No. 12 rod. Heavy-duty churn drills, with 50-ft booms, removed obstructions in the rock mattress. The drills were equipped with specially fabricated 36-in.-dia by 8-ft-long, six-sided stellite-tipped rock bits.

Project manager John Davidson says, "Fortunately, we ordered six bits since spares were continuously in shop for rebuilding." When drill rigs took over, Benotos transferred operations to adjoining caissons.

As the casing advanced, material was removed by a specially designed, single line, 4-cu ft clam bucket. Power buggies carried the dirt to a dump pile where front-end loaders filled trucks for ultimate disposal. Water was encountered about 18 ft below ground level.

When casings reached bedrock, churn drills took over to form the rock sockets. Caissons were cleaned up before concreting by a 40-ft boom crane handling a job-fabricated piston bailer which changed water and removed rock cuttings. Average time for this phase of operation was 12 hours per caisson.

• **Casting piles**—Two 11-cu yd loads of truck-mixed concrete were placed by tremie under a 90-ft head of water. Steel casings were immediately extracted by a reversal of the installation procedure. Jacks mobilized the entire length of inserted casing, oscillating horizontally and extracting vertically. As each 20-ft section cleared grade, it was disconnected and steam-cleaned for immediate reuse.

The third load of 4,500-psi concrete brought the pile 1 ft above ground level. Fifteen 1-in.-dia by 10-ft-long rods tied the piles into the pile caps.

• **Winter construction**—During the three winter months temperatures often dropped to −30F, and at night never rose above zero. Excavated wet material froze to a solid mass in minutes.

To reduce material handling, excavated soil was dumped straight into trucks.

The pile-cap forms were lined with expanded polystyrene and protected with straw and tar-paper. Concrete was delivered in heated trucks and concrete temperatures were rigidly checked. Constant use of torches and steam hoses kept equipment operating.

The ground froze so hard that it had to be thawed with steam before the casings could break through. After the winter ice conditions came a record-setting wet season and a sea of mud bogged down the site.

"It was a toughie for our first job," says the contractor. "Weather conditions intensified the natural problems. However, we proved that a new company can walk without going through the crawling stage."

C. D. Howe Co. Ltd. of Montreal was the engineer for Terminal Grain Elevator No. 4.

UTILITY TUNNELS with VERSATILITY

132″ Lo-Hed® conveyor tunnel being installed for Michigan Limestone Division of United States Steel Corporation at Rogers City.

On completion of Lo-Hed® tunnel at right, 48″ aggregate conveyor system is installed.

91 in. x 91 in. Flat Base utility tunnel for New Jersey firm. Note smooth, watertight joints.

Hi-Hed® makes an ideal utility gallery—assures ample head-room in passage way.

A-M PRECAST CONCRETE UNITS CUT INSTALLATION TIME AND COSTS

American-Marietta reinforced precast concrete pipe is available in a variety of shapes. This permits extreme versatility in the design of utility tunnels for carrying steam pipes, gas mains, electrical cables and telephone lines with enough room for workmen to make repairs. In addition to conventional round pipe, A-M offers LO-HED® with greater width under minimum cover; FLAT-BASE with "built-in" walk way; and HI-HED® for minimum vertical load and maximum lateral support under high fills. Find out how much installation time and money A-M Engineers can save on *your* job with *precast* pipe. Write today for information and literature.

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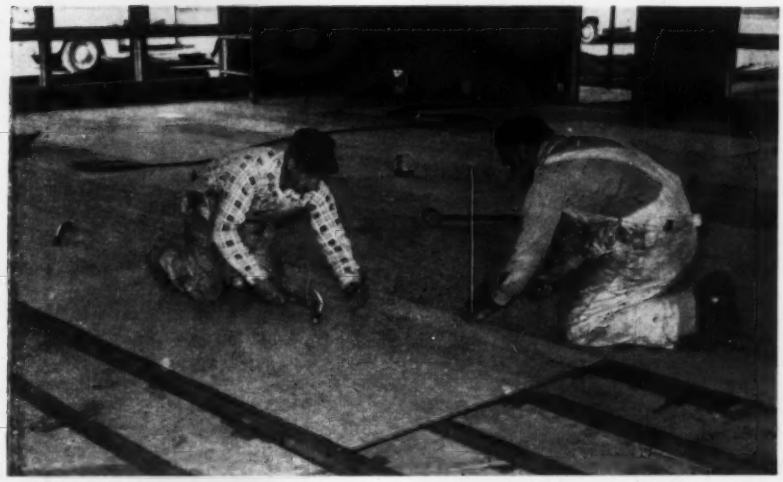
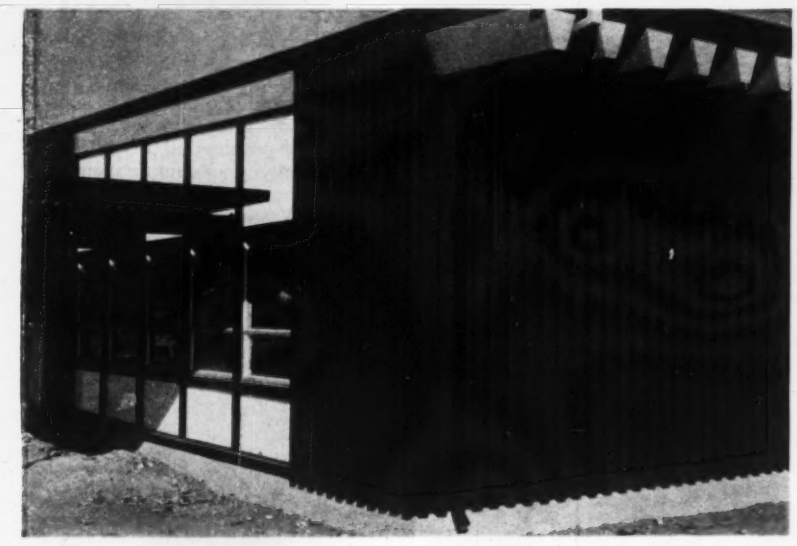


PLYWOOD deck over concrete slab forms channels through which warm air flows.



ROOF overhang exposes trough-shaped beams. Battens dramatize plywood panels.

Plywood Deck Forms Heat Ducts

Plywood floor panels play a major role in an unusual floor heating system for a San Ramon, Calif., two-room school addition.

A tongue-and-groove, §-in. thick, plywood deck overlays 2 x 2-in. timber sleepers fixed with power-driven studs to a 4-in. concrete slab on grade. Warm air circulated through the space between plywood and concrete, transmits heat through the plywood panels. Asphalt floor tiles atop the panels radiate the heat.

Hot water, from an existing boiler, runs through a heat exchanger located between the two rooms. Fans blow air over the coils and through the floor plenum. Perimeter registers compensate for increased heat loss at the windows.

Plywood also forms the structural walls and roof of the addition. Close-spaced trough-shaped beams span the roof. Lighting fixtures mounted in troughs between the beams have plastic diffusers flush with the beam soffit. Built-up roofing over a plywood deck and insulation board tops off the roof.

Architect for the school extension is Aitken & Collins of Berkeley, Calif. Berkeley Plywood Co. of Oakland fabricated all the components.

Precast Service Openings Speed Laboratory Changes

Preformed service openings in prestressed floorbeams give planning flexibility to Philadelphia's $3.7 million, nine-story Temple University Medical Research Building (ENR Feb. 9, p. 28).

The floor consists of 4-ft wide by 2-ft deep concrete channels spanning 50 ft. A 3-in. concrete topping ties the beams together. Precast concrete plugs block out the 9-in. dia service holes, spaced 2 ft. c-c. Metal hangers cast into the beams support mechanical services.

Nolen and Swinburne of Philadelphia is the architect. Structural engineer is Severud-Elstad-Krueger Associates of New York City.

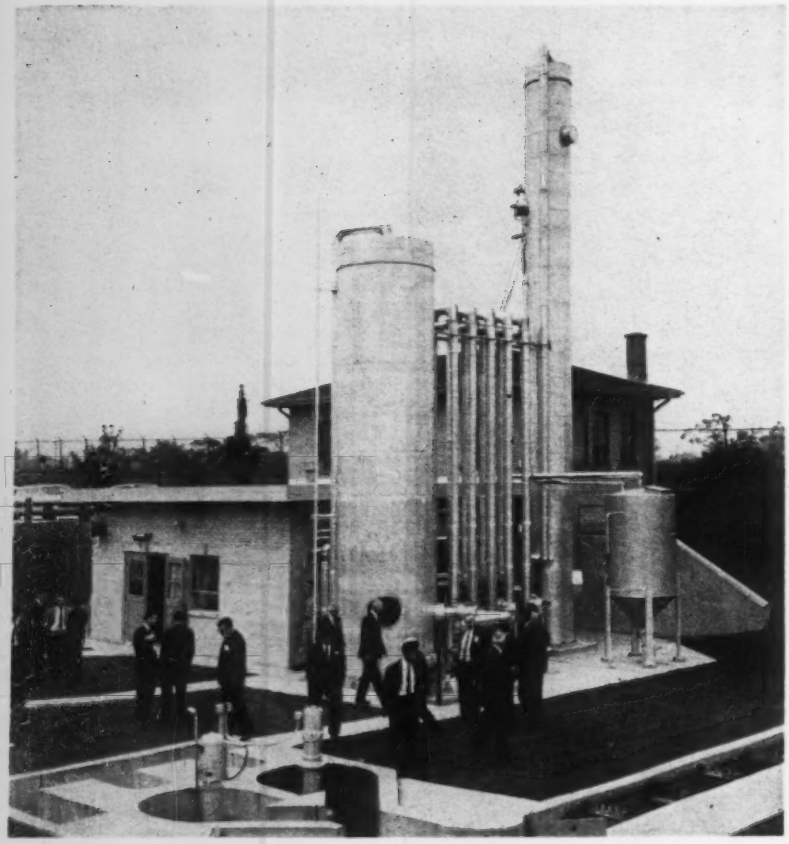
Builders Spray Plastic For Housing Insulation

A sprayed-on urethane foam with a heat-transfer coefficient *K* as low as 0.12 has been used in two demonstration installations of insulation for electrically heated housing.

The low heat transfer results from entrapment of the blowing agent, Freon gas, in the foam cells. Other constituents of the foam are: Hylene (organic isocyanates), made by du Pont, and flame-retardant Vircol-82, developed by the Virginia Carolina Chemical Corp. In its final form, the spray-on foam is a product of the Chase Chemical Corp., Pittsburgh, Pa.

The two houses are in Bethal Park, outside Pittsburgh. Before installation of inside wall materials, the builders sprayed 1¾ in. of foam against the inside of the sheathing between studs. Attic floors also were sprayed.

Builders are Victor Anderko and B. J. Huber Construction Co., both of Library, Pa.



Pint-sized plant wet-oxidizes sludge from 3 mgd of sewage.

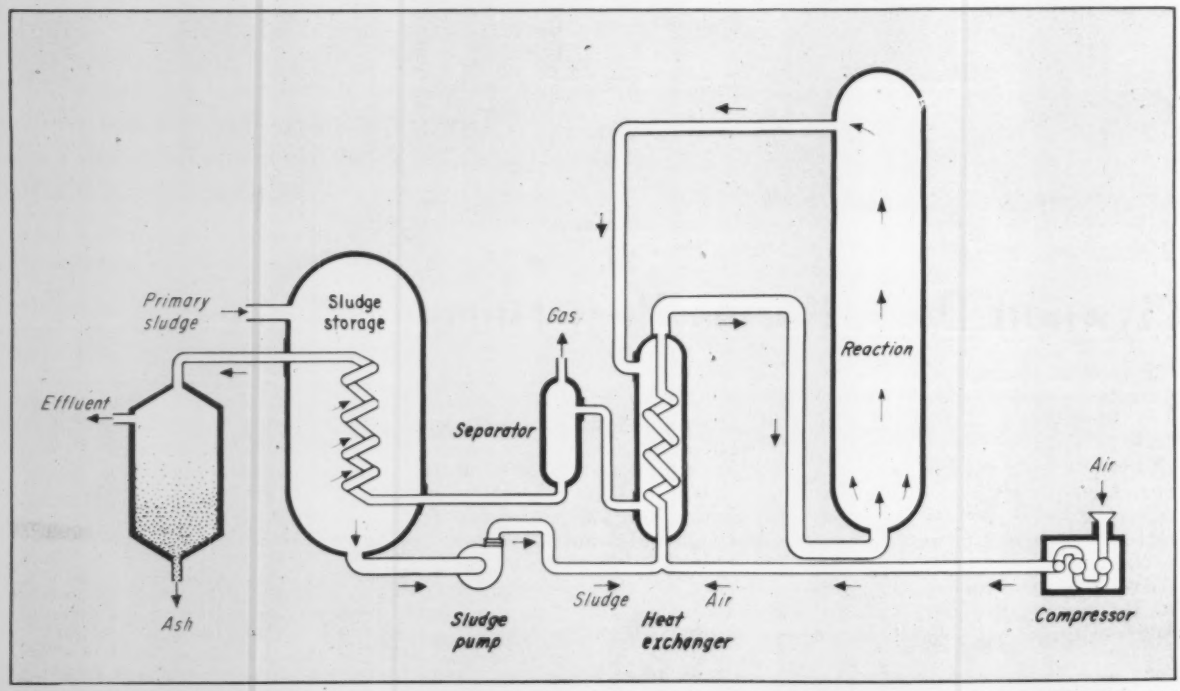
Wet-Sludge

The Zimpro Division of Sterling Drug, Inc., has begun test operations in South Milwaukee, Wis., of the first plant in a new series of Zimmermann process sewage sludge incinerators designed for small cities.

The Zimmermann process is a self-sustaining, flameless combustion system for organic solids suspended or dissolved in water. Raw sludge and air are brought together under pressure. With initial help from outside heat, a reaction begins in which the solids oxidize and release enough heat to sustain the process.

The new series differs from earlier Zimmermann plants in two respects: Standard sizes are smaller and operating temperature and pressure are lower.

The South Milwaukee plant is designed to handle 5,000 gal of sludge a day with a dry solids content of 1 ton—population equivalent 10,000 to 20,000. The company is building another plant of the same size and type in Rye, N. Y., for the Westchester County Public Works Department. Two other sizes available in the new series have capacities respectively one-half and double the capacity at South Milwaukee and Rye.



SCHEMATIC FLOW DIAGRAM charts path of raw, undewatered sludge and air through the Zimmermann process of flameless combustion for organic solids. Oxidation releases enough heat to sustain the process after a start-up boost from outside steam.

Burner Now Made for Small Cities

Several earlier Zimmermann plants are completed or nearly complete.

A Chicago plant with four 50-ton (daily dry solids capacity) units have reached the preliminary testing stage. The Metropolitan Sanitary District of Greater Chicago signed a contract for it in 1959 (ENR June 18, 1959, p. 42) after a year's pilot operation of a 2-ton unit (ENR Nov. 27, 1958, p. 44).

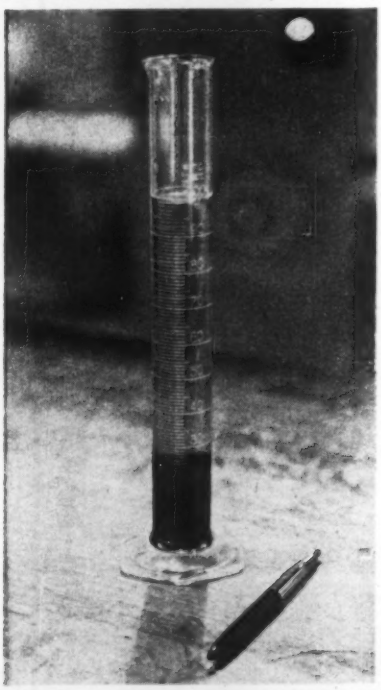
A 5.6-ton unit in Wheeling, W. Va., also is in the preliminary test stage.

Wausau, Wis., has had a 3-ton unit in operation for a year.

A Norwegian pulp and paper manufacturer built the first full-scale plant. It was designed to convert waste pulp liquors into process steam. The plant is reported to be running, but the pulp firm has refused so far to give out information on its performance.

The South Milwaukee plant, typical of the new series, operates at a temperature of 430F and a pressure of 525 psig. The Chicago plant, in contrast, will operate at 536F and 1,800 psig. Wheeling will operate at 525F and 1,200 psig.

The higher temperature speeds up the oxidation reaction and, therefore, reduces the required size of vessels. But space is likely to be less critical for a small plant than for a large one, and lighter weight vessels and simpler mechanical equipment make the low-temperature, low-pressure units lower in cost.



HEAVY ASH end product is 60% less in volume than air-dried digested sludge.

South Milwaukee added the Zimpro unit to an existing 3-mgd primary treatment plant to take the place of sludge digestion facilities. Raw sludge is pumped intermittently from four hopper-bottom primary sedimentation tanks to the Zimpro unit's 5,000-gal sludge storage tank. A 3-hp high-pressure sludge pump and a 40-hp, 3-stage, reciprocating compressor feed sludge and air into the process. The mixture advances through the system at constant pressure, automatically maintained. The temperature rises as the mixture passes through 10 counterflow heat exchangers toward the reactor vessel. Final oxidation takes place in the reactor and the oxidized products flow back in the opposite direction, through the heat exchangers and the sludge storage tank, giving up heat to the advancing mixture and the stored sludge.

The reaction produces three products: a thin reddish-brown liquid, heavy dark sediment or ash, and gases. The liquid and ash roughly equal the initial sludge in volume. The liquid totals about 90%, the ash 10%.

The liquid is returned to the raw sewage inflow of the treatment plant. The ash is drawn off with enough liquid to facilitate flow and piped to a lagoon formerly used for digested sludge. The gases are bubbled through raw sewage to remove the steam content and then vented to the atmosphere.

Dry ash output at the South Milwaukee plant totals about 700 lb a day—about 5.5 cu ft. Air-dried digested sludge from the same 3 million gal of raw sewage would be about 2½ times as great in volume.

The sludge at South Milwaukee runs about 5% solids. The solids comprise about 65% volatile matter and 35% ash. This composition is the assumed basic for the nominal ½-ton, 1-ton and 2-ton solids capacity ratings of the new Zimpro series.

The South Milwaukee plant is started from scratch by applying steam for several hours at 250F to 400F. Once started, however, the reaction sustains itself. The bigger units even produce power as a byproduct. The Chicago plant, for example, will run a 12,500-kw turbine-generator. The Wheeling and Wausau plants have piston expanders coupled directly to the system's air compressors.

The South Milwaukee plant was designed to run either continuously or on a 20-hr day. The Wheeling plant will also operate this way. The Chicago plant, which has capacity for only 20% of the available sludge, will be able to run continuously on a 7-day week.

The process works on both suspended and dissolved organic solids. Zimpro says it can design for almost any degree of COD (chemical oxygen demand) removal. For competitive reasons, however, the process is usually tailored to produce an effluent (the thin liquid) roughly equal in quality to the supernatant from a digester or the filtrate from a conventional sludge dewatering and incineration system, says Zimpro. The South Milwaukee plant reduces insoluble organic solids 80-90%, the firm says.

Equipment mounted on the control panel at the South Milwaukee plant includes controls and indicators for system pressure, sludge tank level, separator level, ash release valve, agitation air (for stored sludge) and oxidation air (for the process); an exit-gas analyzer; and a temperature indicator and recorder that checks seven points in the system every 1½ minutes.

Zimpro says the new series is designed for automatic unattended operation, requiring attention only when refilling and starting. The firm also says that because the pessure vessels are unfired, the plants do not require operators with special skills or licenses. A spokesman for the Boiler and Pressure Vessel Committee of the American Society of Mechanical Engineers verifies that local and state authorities do not generally require licensed personnel for unfired pressure vessels.

Zimpro's contract with South Milwaukee was for $80,000, subject to a $30,000 deduction if the city could complete the building, plus other elements not in the Zimpro contract, soon enough to permit Zimpro to get the plant in operation for demonstration during the Water Pollution Control Federation's annual convention in Milwaukee, October 8-12. The plant started up the week of the convention.

Tabler—

His firm has $200 million worth of hotels on the board.

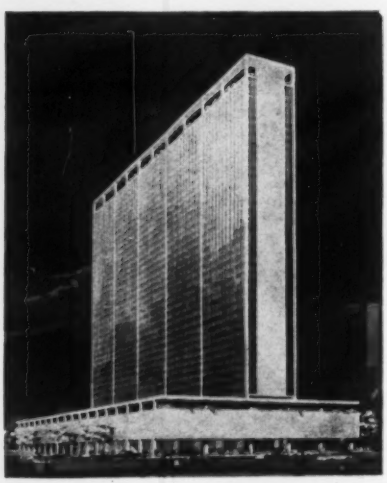
Today, William B. Tabler might be in his New York headquarters working on hotel plans for the Hilton chain. Tomorrow, the architect might be flying to Pakistan to work out design features for Intercontinental hotels.

Dynamic Mr. Tabler has to travel fast and often to keep up with his around-the-world buildings. Almost half of the $200-million worth of hotel projects he and his five associates now are designing is scheduled for abroad.

A Tabler-designed hotel is rising in Paris, three are going up in Ireland and five are under consideration in Austria. He is the consulting architect for a hotel rising in London. In addition, one of his hotels is under construction in Pakistan and three more are planned there. One is in progress in Jerusalem and another is scheduled for Tunis. Closer to home, he has structures planned for Puerto Rico, Buenos Aires and Guatemala City. And in the U. S. he has hotels planned, under construction and completed in all sections of the country.

• **Hotels galore**—Mr. Tabler's newest project—just off the drawing boards—is the 1,200-bedroom Washington, D. C., Hilton. When he designed the hotel, Washington had a 90-ft or eight-story building height limit. But he gambled on a proposal that would allow more than eight stories if the over-all height did not exceed 90 ft, and planned 10 bedroom floors for his hotel. The proposal was recently approved,

EL SALVADOR HOTEL in San Salvador is one of many Tabler-designed hotels abroad.



NEW YORK Hilton will have 45 stories.

Success Through Hotel Design

and optimistic Mr. Tabler won his gamble.

His most unusual project is a 600-room hotel planned for the South Rim of the Grand Canyon. If built, the curved 18-story structure will rise only two stories above grade, but will dip into the canyon. The entrance will be at the top and a swimming pool at the base.

His largest project to date is the $75-million Hilton now under construction at New York's Rockefeller Center. The 45-story building will have 2,150 bedrooms, three levels of underground parking, a special motorists' registration area and a VIP entrance for use when security precautions are necessary. It will have the world's largest ballroom facilities—65,690 sq ft (ENR Aug. 25, 1960, p. 81).

• **It started with a cabin**—A rustic structure marked the beginning of Bill Tabler's architectural career: At the age of 11 he built a cabin near his hometown, Momence, Ill.

He attended Harvard, graduating with a master's degree in architecture in 1939, on completing a nine-year course in seven—five in architecture and four in civil engineering.

After leaving college, he joined Holabird & Root, Chicago architects-engineers at a salary of $15 per week. With them, he worked on his first hotel project as field superintendent for the Washington, D. C., Statler.

In 1943, he entered the Navy and served with the Seabees in the Pacific as a lieutenant.

After the war, in 1946, he started his own architectural firm—at first on a retainer basis with the Statler chain, and later, unaffiliated. After studying eight Statler hotels, he suggested economical ideas for modernization. For example, as an associate architect he cut 1 million cu ft out of the design for the Los Angeles Statler.

His present office—most appropriately located in the penthouse of New York's Statler-Hilton—is organized on the job-captain system, with five key men. Instead of stressing departmentalization, he places each associate in complete charge of specific projects.

"He works on it from beginning to end. It is his project. This gives my associates more freedom to do what they want," Mr. Tabler says.

The 47-year old architect is proud of the way his firm is organized. And he is proud of the recognition that it receives. Most recently, he won the AIA Fellowship Award for his hotel designs. And in 1958, he was honored with the Horatio Alger Award, given in recognition of achievement from humble beginnings.

• **Cities within cities**—Mr. Tabler says modestly, "If you can design a hotel, you can design anything. They're cities in themselves. You have to think of everything.

Mr. Tabler points out that hotels provide the daily necessities of life such as housing, feeding, medical care. Some hotels even accommodate more persons than many villages. The Dallas Hilton houses 10,000 persons, the ballroom at the Pittsburgh Hilton has room for 2,660. After citing these statistics from memory, Mr. Tabler highlights this comparison of hotels and cities by noting that his home town has a population of only 2,200!

Since hotel designers are dealing with "cities within cities," they must be aware of human wants and needs. Mr. Tabler feels that "it is the hotel architect's job to find out what the public wants and to give it to them." And he does. He studies trends in living habits and plans his hotels accordingly.

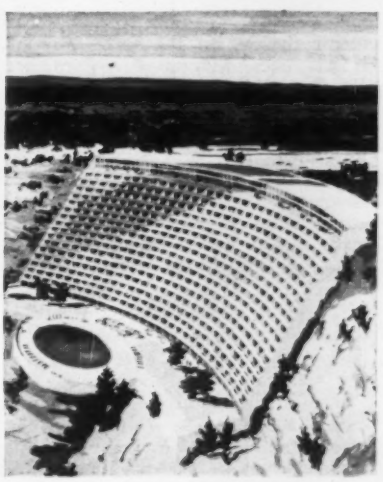
He sees a big trend toward self service. Pushbutton elevators, for example, are now incorporated in the new plush hotels. "Years ago," says Mr. Tabler, "I was told this was unthinkable. But now, this is what the public wants." In the same way, he feels, that direct dial telephones will gain popularity in U. S. hotels. But he adds, "In Europe, they would never go over."

Mr. Tabler notes that even hotel heating and cooling systems are being adapted for self service, with individual control in each bedroom.

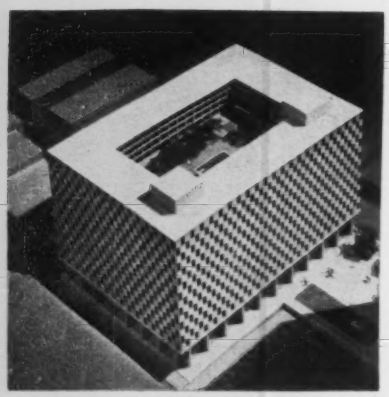
• **Ways to cut costs**—Cost-conscious Mr. Tabler constantly seeks the best for less money—or, as he says, "the most straightforward and economical solution to the problem."

(Please turn the page)

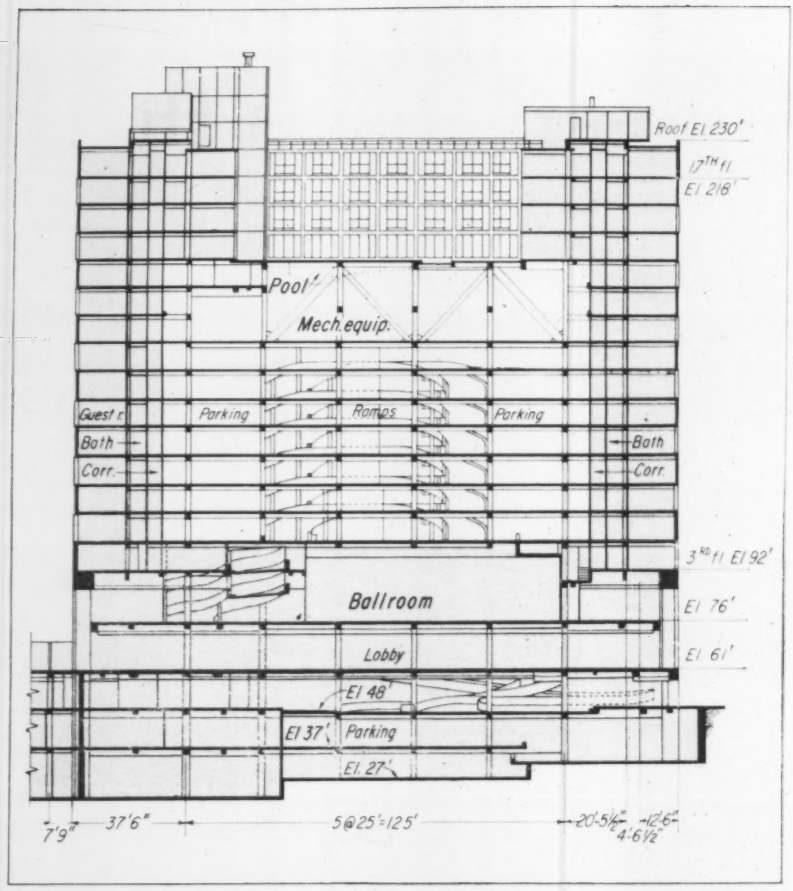
WASHINGTON Hilton will have 10 stories of rooms above ground, ballroom below.



UNDER STUDY —hotel in Grand Canyon.



SAN FRANCISCO hotel is topped by a court with swimming pool.



SECTION through San Francisco hotel. Interior garage is suspended from trusses.

He has what he calls a rule-of-thumb check list on costs:

- Room construction should cost $1,000 per $1 average room rate.
- Land should account for no more than 10% of the building cost.
- Hotels should be designed to have less than one employee per room, and should break even at 60% to 65% occupancy.

Mr. Tabler believes that it is easy to economize in hotel construction if a designer thinks in terms of mass production. "We are living in an age of mass production and the facilities must mirror this."

Bedrooms and bathrooms in Tabler-designed hotels are standardized. A repetitive bathroom design, for example, permits tile setters to learn the pattern quickly and to work more efficiently. He cuts costs by putting plumbing back to back. He lets the lavatory and toilet double, respectively, as a dressing table and seat, without taking up additional space. He also includes a conveniently located towel hook—to induce reuse of towels. (This can result in a savings of $7,000 per year in laundry costs.)

Mr. Tabler has found so many cost-cutting devices for the bathroom that he has been humorously nicknamed "W. C." Tabler.

Designing compact, but flexible-service areas is another Tabler economy. He arranges the facilities of one main kitchen, for example, to service five different dining areas. And one large central ballroom can be divided into smaller private rooms for meetings and dinner parties by using sliding partitions.

Whenever possible Mr. Tabler exploits natural and local materials. "It is logical and obvious," he says, "that such materials would be cheaper."

Accordingly, for his hotel now under way in Karachi, Mr. Tabler uses terrazzo containing a local stone for the facade. He points out that in the U.S. a terrazzo building would be a luxury item, but in Pakistan it is economical.

However, his hotels are not molded into set patterns governed by these rules. "Each job is different," Mr. Tabler says, "and what is economical for one hotel may not be for another." For example, the 45-story New York Hilton will be framed with structural steel, whereas reinforced concrete was used for the 22-story Pittsburgh Hilton.

One of Mr. Tabler's associates says that their greatest cost-saving device is "an open mind." Each building is designed for a specific site, and its peculiarities are taken into consideration.

For the San Francisco Hilton, now under construction, Mr. Tabler designed a single-loaded corridor, which he usually tries to avoid. In this structure, with the rooms surrounding a parking-garage core on seven floors, it was "more feasible and practical to have this type of corridor," says Mr. Tabler. Approaching the problem with an open mind paid.

For the Hiltons planned for New York City and Washington, D. C., Mr. Tabler works closely with the general contractor, Uris Brothers. On these jobs, the architect and builder learn "tricks of the trade" from each other.

Plans for the New York Hilton call for 4,500 hopper-type windows, with the bottom half hinged and the top half in a fixed position. Mr. Tabler estimates that this structural device, of having the windows only 50% operable, will save $50,000.

In the same hotel, Mr. Tabler incorporated a cost-saving elevator plan, frequently used for office buildings. This features shorter elevator runs and more expresses. For example, two sets of three elevators will service ten floors each, instead of having six elevators service twenty floors. Costs are cut by reducing the number of stops and openings (60 openings instead of 120), and service is improved.

"But," and this Mr. Tabler says emphatically, "hotels are designed to house people. And the money is still in the bedrooms." He points out that they account for 70% of hotel profits. And another of his cardinal rules of thumb is that total bedroom area should be equal to or greater than public and service areas.

• **Beefs against codes**—Since Bill Tabler designs buildings all over the U. S.,

(Men and Jobs continued p. 49)

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After grading and paving two airfields at Fort Rucker, Alabama, Deep South Construction Company is now building a third airfield at the Army's training center for helicopter and liaison plane pilots.

This Montgomery, Alabama, contractor will move some 700,000 cubic yards of earth and then grade and pave four 2000-foot runways and a huge aircraft parking area. To date, Deep South has averaged about 7000 yards each day under the critical eye of Glenn Owens, Project Superintendent.

Mr. Owens won't risk any chance of equipment downtime attributable to lubricants. He sticks to a strict PM program that was set up by Jack L. Carr, president of Deep South Construction Company.

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Left to right, Jack L. Carr, President, Deep South Construction Co., W. A. Bacon, Gulf Sales Engineer, and Glenn Owens, Project Superintendent. ▶ On-the-job advice is another way Gulf serves contractor-customers.

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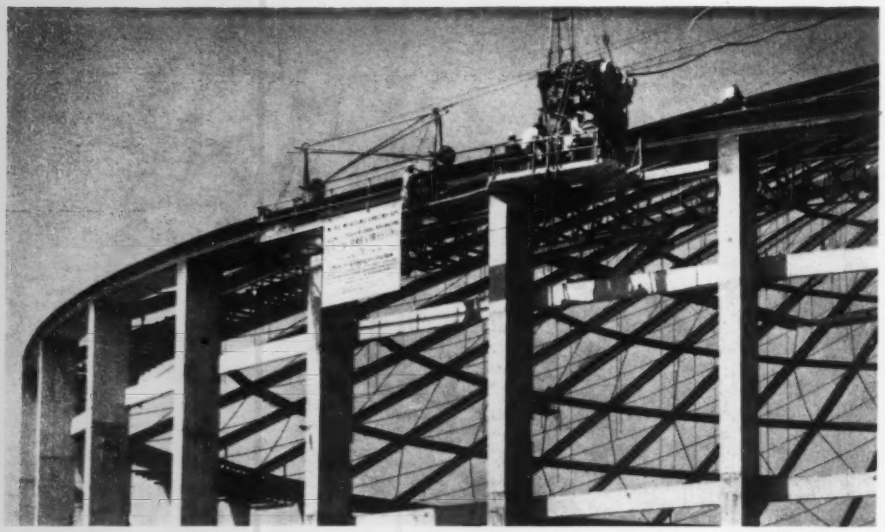

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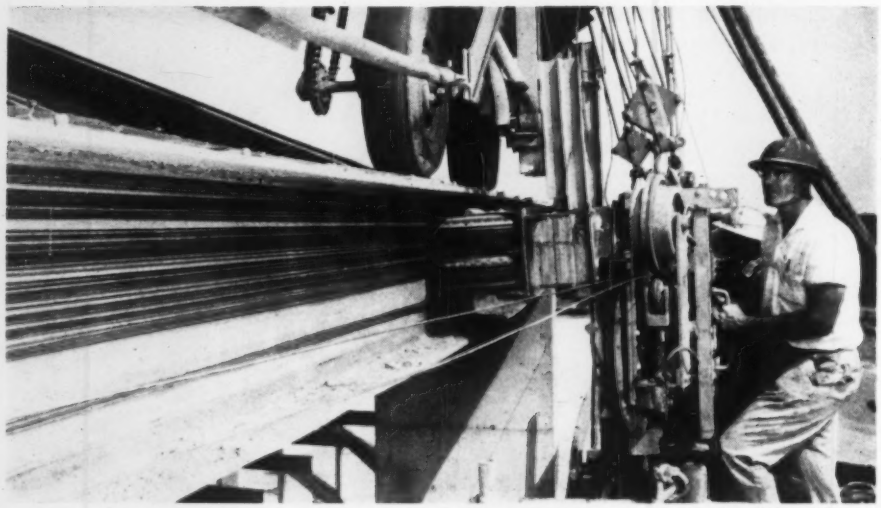
This is Mississippi's partially completed coliseum in Jackson. Visible atop the columns is the tension ring beam that supports the roof. Prestressed with CF&I Wire, the beam will withstand more than 3 million pounds tension.

160 miles of wire prestresses new coliseum



Wire-winding machine, operated by its designer, Mr. Jack Crom, pulls CF&I Prestressed Concrete Wire tight around the ring beam. After the wire has been laid and tensioned, pneumatic mortar is applied. In all, 15 layers of prestressing wire were used.

The State of Mississippi's new coliseum — now under construction on the Fair Grounds in Jackson — will feature an unusual form of construction that is both economical and efficient. The 2800-ton conical roof is supported by a giant tension ring beam prestressed with 160 miles of CF&I Prestressed Concrete Wire.

This prestressed method was the first choice because preliminary engineering studies proved a saving of approximately 10% could be realized in comparison with other methods.

Why was CF&I Prestressed Concrete Wire chosen? "Because we had dealt with CF&I in the past," Mr. Crom, President, Crom Prestressing, Inc., an affiliate of the Crom Corporation, Gainesville, Fla. says, "and they have always provided us with valuable technical information and helped us with our metallurgical problems. Also, we've always been able to count on prompt delivery of shipments."

In addition to Prestressed Concrete Strand and Wire, CF&I produces a wide range of steel products for American industry, including: Welded Wire Fabric; Rebars; Nails and Staples; Realock Chain Link Fence; Grader Blades and Cutting Edges; CF&I-Wickwire Rope; and many other quality steel products. For complete information, contact your nearby CF&I sales office.

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TABLER: "If you can design a hotel, you can design anything."

he is keenly aware of inconsistencies and variations in building codes. (He is chairman of the American Institute of Architects Building Codes Committee.) Ballrooms must be placed on the roof, half way up, on the ground floor or in the basement, depending on the local building code. Exits from buildings with public assembly rooms must be 24-in. wide in Massachusetts and 20-in. in Pittsburgh.

"The plans for the Statler Center in Los Angeles," he says, "had to conform with 21 different codes. And Los Angeles is, relatively speaking, progressive," he says.

He complains that "practically every city in America has its own code governing buildings design and materials, and the codes vary enormously, and unpredictably, from city to city." He adinits that it is almost impossible to have one national code. But he says, "Local and state governments should adopt and follow the four AIA-recommended model codes—those developed by the Building Officials Conference of America, National Board of Fire Underwriters, Southern Building Congress and the International Conference of Building Officials.

Mr. Tabler has had to fight many outdated building restrictions. In Dallas, for example, he battled to get approval of a bathtub drain trap that Boston and New York have had for about 50 years, and thus saved $15,000.

His most recent fight against "unduly restrictive" code requirements was on behalf of the San Francisco Hilton. Some of the points at issue were bathroom ceiling heights, corridor-beam clearances, metal vs wood doors, smokeproof towers.

• San Francisco's code called for a 7-ft 6-in. minimum bathroom ceiling height, which left ducts and pipes uncovered. Mr. Tabler's plans called for a 7-ft 2-in. ceiling height, but which covered the pipes.

• According to the code, 8 ft is the minimum height for corridor beams. Mr. Tabler's beams were 8 ft 6 in. above the floor in most places, but with a dip to 7 ft 3 in. every 25 ft.

• Wood doors, 1¾ in. thick, were required, even though they were not fire resistant. Mr. Tabler used metal doors that had been tested and rated at 1½ hr.

• Smokeproof towers, which had been dropped from the National Board of Fire Underwriters' Code, were required by the San Francisco code. Mr. Tabler argued that his ventilated stairs were more efficient and less dangerous than the smoke towers.

Mr. Tabler sees San Francisco's code as a maze of restrictions that are vigorously administered. He points out that the city code is less specific about the inclusion of smokeproof towers than the state code, and that the city code should be applied to his hotel. Building officials, however, insisted on applying the more rigid state requirements. Mr. Tabler—generally easy-going and reserved—was adamant. He fought this and won, and the new San Francisco Hilton is now under construction.

• **Restrictive labor practices**—But not all his gripes against building restrictions concern codes. Mr. Tabler has found that some unions impose hindrances to economical construction. In some cities, he says, painters cannot spray or roll paint without special permission from the union. In New York, the installation of sheet metal is allowed only if it is fabricated by New York sheet metal workers.

All these limitations by codes and by unions, complains Mr. Tabler, contribute to rising costs in hotel construction and stifling of technological progress.

He estimates that the London Hilton would cost 10% to 15% more if it were built in New York. "In this respect," he adds, "the Europeans are more progressive, because they are not bound by such restrictions."

• **Motels are hotels**—Mr. Tabler, with a keen eye to present and future prospects sees a definite trend toward hybrid hotels. (These combine hotel and motel facilities in one superstructure.) "Motels and hotels are the same thing. They both provide accommodations for the traveler," says Mr. Tabler.

The San Francisco Hilton is an example. It is a 17-story building with seven levels of ramp parking in the core. The motorist will be able to park his car inside the building, walk through fireproof doors into a corridor and then to his room. And this hotel is in the heart of a downtown area.

The unique, 1,200-bedroom hotel will have parking space for 750 cars—400 on the seven guest floor levels and 350 in a three-level basement garage. And across the street, there is room for 1,500 more cars in parking garages. This gives the hotel a 2 to 1 parking-to-bedroom ratio, unprecedented in a downtown area.

The seven steel-framed parking floors above grade are suspended from nine, two-story-high steel trusses atop the core. This makes possible a 20,000-sq ft, columnless ballroom under the parking core. The trusses also support a rooftop swimming pool and patio. Mr. Tabler, economical of space, houses mechanical equipment between the trusses. The bedroom portion of the building is concrete framed.

The exterior walls, of cast-in-place concrete, are punctuated by windows in a checkerboard pattern. The walls not only are decorative, but also act as diagonal earthquake bracing.

The hotel will have as it plaza neighbor, a 22-story office building with the same facade.

Catering to completely different needs, Mr. Tabler's new Hilton in the heart of metropolitan Washington, D. C., will feature resort-type conveniences, with open gardens and a pool-terrace-tennis courts area.

The reinforced concrete hotel structure, on only 20% of the site, is Y-shaped. This gives the hotel a maximum amount of rooms, while still devoting much space to open areas, yet remaining within the legal height limit of 90 ft.

The compactly built hotel has many of its features underground—including a garage, convention facilities and a 30,000-sq-ft ballroom. The bedrooms average a spacious 208 sq ft. (In the Washington Statler Hilton, a hotel on which Mr. Tabler worked in 1943, the average bedroom size is 155 sq ft.)

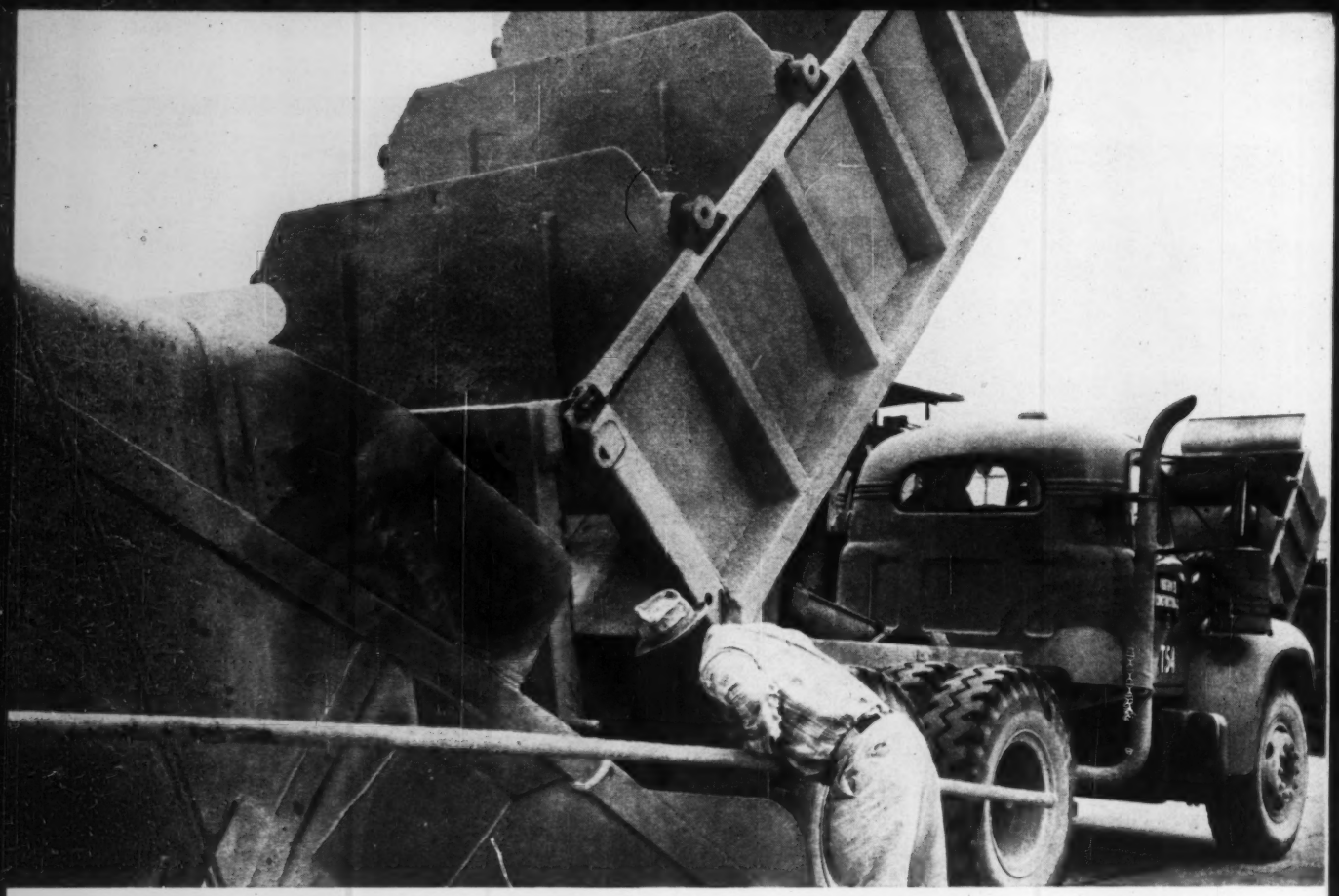
• **Hotels in the sky**—As for the future, Mr. Tabler says he will keep on designing hotels to keep up with the Jet Age and its unprecedented amount of travelers.

"Hotels by definition," he says, "are a product of travel. And today there are more travelers flying from one destination to another in less than a day. We must provide rooms for them."

Mr. Tabler, himself a product of the Jet Age, travels between 250,000 and 300,000 miles a year.

"With talk of space travel," he comments jovially, "I can even anticipate hotels out there. For relaxation, instead of floating in pools, you will float in air."

Meanwhile, back on earth, Bill Tabler continues designing hotels around the globe at an unprecedented rate.



All the dry mix leaves the box because of the smooth, dent-free surface of USS "T-1" Steel bottom plates. Extra clean-out men are not needed. Understructure, sides, batch and tail gates are USS COR-TEN Steel for strength and light weight. Truck Body Fabricator: Capital Industries, Inc., Seattle, Washington.

The best combination for performance . . .

Dump truck bodies made of USS "T-1" and COR-TEN Steels

"Pouring 4,100 feet of concrete highway is a good day's work," says Louis Tomaso, pouring superintendent for Northwest Construction Company, Seattle, Washington. "This kind of production takes the best equipment. That's why we are sold on dump boxes made with U. S. Steel's 'T-1' and COR-TEN Steels.

"With 'T-1' Steel in the bottoms and COR-TEN Steel in the sides and gates, we get a clean dump every time," says Mr. Tomaso. "The surface remains smooth and dent-free. None of the mix hangs up in the truck."

Northwest's trucks also double as earthmovers and here's where they meet their real test. The maintenance superintendent, Homer Baer, says, "USS 'T-1' Steel is tough enough to take the impact of heavy rocks falling from the shovel and the $^{3}/_{16}$-inch bottom plates have never ruptured, stretched or dented."

Less weight—more payload. The combination of USS "T-1" Constructional Alloy Steel and COR-TEN High Strength Steel cuts 1,020 pounds of dead weight from the trucks and allows bigger payloads. "T-1" Steel has a minimum yield strength of 100,000 psi and COR-TEN Steel's yield point is 50,000 psi minimum. Both steels are workable and weldable and offer superior resistance to abrasion and atmospheric corrosion. For more information, write to any district office of United States Steel or to Room 2801, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS, "T-1" and COR-TEN are registered trademarks

United States Steel Corporation · Columbia-Geneva Steel Division · National Tube Division · Tennessee Coal and Iron Division · United States Steel Export Company

This mark tells you a product is made of modern, dependable Steel.

USS United States Steel

Unit bids show wide variation for . . .

California Freeway Award

Madonna Construction Co., San Luis Obispo, took the award for a new six mile addition to California's freeway network for $2,218,691. The Division of Highways pulled five bids for the four-lane highway and three four-span bridges. Madonna was 1.6% under Frederickson and Watson Construction Co., Oakland, but 14% below the high. J. C. Womack is California's highway engineer and chief of the Division.

The addition runs 2.3 miles north and south of Gonzales in Monterey county. Work includes grading roadbeds, frontage roads and ramps, and surfacing with asphalt concrete on an aggregate base and a cement treated base.

The low took an early lead with excavation and aggregate prices. Prices for 512,000 cu yd roadway excavation range from Madonna's low of $0.36 to a high of $0.475 a yard; bids for class 2 aggregate run from the low's bid of $0.69 for 197,000 ton of subbase to a high of $1.30 a unit, and from $2.00 to $3.30 a ton for 110,000 ton of base.

Unit prices show considerable variation among the five bidders. Type A asphalt concrete aggregate, for example, ranges from $4.50 to $7.40 a unit for 78,000 tons. Class A concrete moves up from a low of $120 a yard to a high of $200 a yard for 140 cu yd of concrete for minor structures, from $54.00 to $60.00 for 960 yards for structures, and from $65.00 to $85.00 a yard for 1,435 cu yd of concrete for bridges.

The bidding includes:

1C Madonna Const. Co., San Luis Obispo, Cal.	$2,218,691
2 Fredrickson & Watson Const. Co., Oakland, Cal.	2,254,830
5 Ball & Simpson, Berkeley, Cal.	2,586,526

Bids: 9-6-61 Items	Unit	Quantity	Unit Prices 1C	 2
Barricade, tmbr, tp B[a]	ea	55	$40.00	$40.00
Surface, obliterate	sy	2,200	0.15	0.30
Fence, prop, reconstr, tp WM	lf	2,100	0.30	0.35
Clear & grub	ls	job	309,000	60,000
Water, supply, develop	ls	job	46,000	60,000
apply	Mgal	25,500	0.01	1.45
Excavation, rdwy	cy	512,000	0.36	0.38
str	cy	7,800	2.50	2.50
bri	cy	805	2.50	3.50
Backfill, str	cy	4,400	4.50	5.00
bri	cy	480	4.50	5.00
Excavation, ditch	cy	8,500	1.50	1.70
Compact, original ground	sy	164,000	0.10	0.07
Overhaul	stay	28,000,000	0.003	0.0032
Prepare, planting areas	sy	108,000	0.03	0.025
excavation slopes	sy	50,000	0.04	0.04
Fertilizer, commercial	t	5	175.00	180.00
Straw	t	110	60.00	60.00
Seed	lb	5,600	0.30	0.22
Roadway, finish	ls	job	6,000	8,000
Subbase, aggr, cl 2	t	197,000	0.69	1.00
Base, aggr, cl 2	t	110,000	2.00	2.70
Aggr, cl B, RMCTB[b]	t	12,800	3.00	4.00
P cmt, base	bbl	2,040	5.00	5.00
Asph, liq MC-2, curing seal	t	42	50.00	68.00
Asph emul, seal coat & penetration binder	t	208	50.00	80.00
Screenings	t	470	8.00	9.00

Bids: 9-6-61 Items	Unit	Quantity	Unit Prices 1C	 2
Aggr, asph conc, tp A	t	78,800	4.65	5.50
open gr, asph conc	t	4,700	5.65	6.00
Asph, paving, asph conc	t	4,620	30.00	27.00
conc dikes[c]	lf	21,200	0.18	0.15
conc misc areas[c]	sy	4,300	1.50	1.00
liq SC-2, prime coat	t	280	40.00	40.00
Piling, conc, cl II[a]	lf	3,175	3.75	3.50
drive	ea	80	100.00	100.00
Conc, cl A, minor str	cy	140	120.00	135.00
str	cy	960	55.00	54.00
bri	cy	1,435	65.00	73.00
Steel, reinf bar	lb	128,000	0.11	0.10
bri	lb	330,000	0.11	0.10
Mesh reinf, 6" x 6", 10 ga	sy	4,700	0.75	0.60
Mortar, air blown	cy	460	50.00	54.00
Sign str, steel	lb	23,000	0.45	0.47
Tmbr poles, rdside sign, cl 1	lf	150	3.00	4.26
cl 2	lf	800	3.00	4.10
rdside sign, Douglas fir	fbm	530	0.75	0.60
Wood, rdside sign	fbm	4,600	0.60	0.60
Signs, mount on str & electrollers	ea	8	25.00	35.00
RCP, cl III, 12"	lf	20	4.00	3.00
18"	lf	950	4.00	4.00
24"	lf	3,380	6.00	6.00
30"	lf	670	9.00	7.50
36"	lf	1,340	11.00	10.00
42"	lf	250	15.00	14.00
48"	lf	300	20.00	18.00
PMP, underdrains, 8", 16 ga	lf	4,900	2.00	1.90
Filter mat	cy	1,060	6.00	10.00
CMP, downdrains, 8", 16 ga	lf	84	3.00	3.30
Entrance tapers, 8", 16 ga	ea	10	65.00	60.00
Anchor assemblies, 8"	ea	4	25.00	31.00
CMP, energy dissipators	ea	10	45.00	45.00
Iron & steel, misc	lb	7,800	0.35	0.40
Conc, slope protect, sacked	cy	140	40.00	40.00
cl B	cy	100	40.00	35.00
cl B, curbs & island paving	cy	1,480	40.00	38.00
Fence, freeway, tp WM, met post	lf	16,800	0.60	0.65
chain link, tp CL-6	lf	25,300	1.40	1.20
gate, freeway, 14'	ea	1	75.00	55.00
Monuments, survey	ea	26	20.00	13.00
Markers	ea	470	7.00	6.50
Railing, met beam guard	lf	4,600	3.30	3.20
barrier, tp 2	lf	1,407	11.00	13.50
Lgt & sign illum sys, hwy	ls	job	25,000	26,000

a furnish b RMCTB road-mixed cement treated base c place

Completion time: 275 working days

Liquidated damages: $350 calendar day

ENR Constr. Cost Index (1913=100): 20-cities avg.—854.01

Hourly base rates and fringe benefits include: asphalt plant engineer, $4.13 plus $0.10 Health and Welfare, $0.15 Vacation and $0.10 Pension; cement mason, $3.97 plus $0.11 Health and Welfare, $0.10 Pension; carpenter, $2.83 plus $0.11 Health and Welfare, $0.15 Vacation, $0.10 Pension.

Selected equipment rental rates (not including operators) applying to this highway contract include:

Items	Capacity	Rate/hr
Air compressors, self-contained pwr unit, port, 1 & 2 stage, water or air cooled, gas or diesel engine	0- 65 cf/min	$2.10
	65- 85 cf/min	2.35
	85-105 cf/min	2.50
	105-160 cf/min	3.10
	160-210 cf/min	3.85
	210-315 cf/min	5.15
	315-365 cf/min	5.85
	365-425 cf/min	6.05
	425-500 cf/min	6.45
	500-600 cf/min	7.60
		0.25
Concrete mixers incl measuring tank, batchmeter & pumps when req	to 4½	1.05
	4½- 6 cf	1.15
	6 - 8½ cf	1.35
	8½-12 cf	1.85
	12 -16 cf	2.60

Items	Capacity	Rate/hr
Distributors, trailer mounted, bit, pressure incl pump & spray bar; trailer mount not incl tow unit	0-400 gal	1.50
	401-800 gal	2.00
truck mount incl motive pwr truck mounted	0- 800 gal	5.85
	801-1,400 gal	7.00
	1,401-1,800 gal	8.15
Light plants, portable incl wiring & lights; gas or diesel engine, AC or DC	to 1,000 watts	0.45
	1,000- 1,750 watts	0.60
	1,750- 2,900 watts	0.70
	2,900- 4,500 watts	1.00
	4,500- 6,000 watts	1.15
	6,000- 9,000 watts	1.55
	9,000-12,000 watts	1.75

Items	bucket capacity	drawerbar hp	Rate/hr
Loaders, crawler tractor tp	½ cy	20- 33	4.80
crawler tractor tp incl tractor w attachments; front end or overhead (hp ratings govern)	½-1 cy	34- 43	5.60
	1½-2 cy	44- 64	7.45
	1½-3½ cy	65- 85	11.90
	2½-5 cy	86-135	15.85
	3½ & up	136-200	21.40
	bucket size		
front end wheel tp incl tractor w attachments, gas or diesel engine	⅜ cy		3.80
	½ cy		4.10
	½ cy		4.55
	¾ cy		5.00
	1 cy		5.55
	1¼ cy		6.10
	1½ cy		7.30
	over 1½ to 2 incl cy		8.75
	over 2 to 3 incl cy		10.50

Items	size of discharge	discharge capacity/hr	Rate/hr
Pumping units, centrifugal, port incl pwr, hoses suction and dischge, foot vlv and fittings, self-priming	1½ in	3 M gal	0.80
	2 in	7-10 M gal	1.10
	3 in	15-20 M gal	1.65
	4 in	30-40 M gal	2.25
	6 in	70-90 M gal	3.15
	8 in	125 M gal	4.10

Items	loaded weight	Rate/hr
Rollers, steel & grid, gas and diesel, 3 wheel, 2 or 3 wheel tandem	3- 4.9 t	2.75
	5- 7.9 t	3.20
	8- 9.9 t	4.05
	10-11.9 t	4.55
	12-15.9 t	5.50
buffalo K-45, 16 tons		9.50

Items	capacity, struck meas	Rate/hr
Scrapers, w out power units for crawler tp tractors	0 - 3¾ cy	2.00
	3¾- 5 cy	2.10
	5 - 7½ cy	3.05
	7½-10 cy	3.20
	10 -13½ cy	4.35
	13½-16 cy	4.35
	16 -20½ cy	5.95
	20½-27 cy	6.40

Items	capacity when used as power shovel	Rate/hr
Shovel, power-crawler, gas & diesel as shovel, backhoe, dragline, clamshell, pile driver, crane compl w bucket and boom factory length & attachmnts	⅜ cy	6.25
	½ cy	7.00
	⅝ cy	8.15
	¾ cy	9.35
	1 cy	10.80
	1¼ cy	12.85
	1½ cy	14.60
	1¾ cy	17.50
	2 cy	19.25
	2¼ cy	20.40
	2½ cy	22.15
	3 cy	28.00
truck mounted, as shovel, clamshell, backhoe or dragline	¼ cy	5.55
	⅜ cy	7.60
	½ cy	8.45
	¾ cy	11.35
	1 cy	12.25

Items	drawbar hp	Rate/hr
Tractors—crawler, diesel and gas	20-33	3.50
	34-41	3.80
	42-46	4.35
	47-52	4.95
	53-62	5.55
	63-72	6.25
	73-89	7.00
	90-135	8.45
	136-200	10.75
	201-300	17.35
	hp	
2 or 4 wheel, rubber-tired gas or diesel	18-24	2.75
	25-35	2.90
	36-46	2.90
	90-103	7.30
	104-160	8.75
	161-200	10.75
	201-250	12.40
	251-300	14.60

Items	hp	scraper capacity, struck meas	Rate/hr
rubber-tired with scraper, gas, diesel or butane, incl power control units	80-100	6 & over	10.80
	101-145	10 & over	11.95
	146-160	13 & over	12.85
	161-200	13 & over	14.60
	201-250	16 & over	17.30
	251-300	20 & over	21.30

NOT TOO TOUGH FOR A CLEVELAND "J"

HIGH, DEPENDABLE, DIGGING PRODUCTION in tough rock-digging like this shows how Cleveland J Trenchers pay off. On tough jobs or easy, on jobs of every kind, utilities, pipelines, footings, drainage, etc., Cleveland J's *dig more, dig better*—pay off because of Cleveland features like these:

- **Over 30 positive, non-slipping, power-saving digging speeds—the right power-speed combination for every soil and condition.**
- **Positive, fast, full-range boom hoist.**
- **1,000-hour-lubricated, 100% anti-friction-bearing-mounted track with dual drive and support—*the world's finest trencher crawler.***
- **Big 16" x 3" hydraulic steering brakes.**
- **V conveyor with automatic side-to-side shift.**
- **Pulley-enclosed, dual, independent, hydraulic conveyor drive with instant control of discharge direction and speeds up to 1,000 FPM.**
- **Big 330+-cubic-inch engine.**
- **100% control of every operation at operator seat with full job-visibility for the operator.**

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Materials Prices

Monthly Market Quotations By ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, Nov. 23; Next, Dec. 21.
- Iron & Steel Products, Pipe: Last Nov. 16; Next, Dec. 12.
- Cement, Aggregate, Ready Mixed Concrete, Asphalt: Last, Nov. 9; Next, Dec. 7.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

Item	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
STRUCTURAL CLAY TILE																							
partition-scored																							
3x12x12 in.	M	$154.95pe	$217.00	$135.00pss	$232.00†	$137.00ll	$179.00mmjvv	$205.00ff	$162.00	$170.00	$257.00	$158.00 r	$218.00pe	$178.00	$236.00wwh	$259.00ss	$200.00t	$180.00mmpp	$156.85*	$235.00pt	$168.78uqoo	$169.00rr
4x12x12 in.	"	154.95pkke	231.00	152.00pss	248.00†mm	149.00ll	190.00mmjvv	219.00ff	162.00	185.00	274.00	158.00 r	225.00pe	178.00	236.00wwh	275.00ss	213.00t	199.00pp	177.10*	270.00pt	180.93uqoo	185.50rr
8x12x12 in.	"	309.90pe	434.00	.....	463.25†mm	280.00ll	355.00jddmm	410.00	318.75	310.00	514.00	312.00 r	452.00pe	371.25	378.00wwch	517.00ssxx	400.00t	380.00pp	235.30dd	490.00pt	325.00uuqoo	360.00rr
Load Bearing—Scored																							
8x12x12 in.	"	387.40pe	491.00	303.00p	556.00†mm	.....	390.00jmmvv	465.00ff	387.75	310.00	582.00	312.00 r	225.00pwe	371.25	360.00wwhn	597.00ss	453.00t	410.00pp	159.40qq	265.00pwt	220.00qoo	281.50rr
10x12x12 in.	"	.....	602.00	376.00p	.....	.....	422.00jmmvv	.....	472.50	390.00	767.00	400.00 r	.....	.....	.....	.....	607.00t	440.00pp	.....	.....	400.00qoo	405.00rr
12x12x12 in.	"	.....	690.00	465.00p	.....	.....	500.00jmmvv	709.00ff	585.00	442.00	876.00	500.00 r	.....	.....	.....	.....	693.00t	621.50pp	.....	.....	.....	506.00
BRICK, common backing	"	33.25uu	36.00	27.00††	43.50p	32.00	50.00jk	44.00tt	32.00	35.00xx	53.50pmm	34.00	$42.00uu	49.50vpe	42.00	46.00p	40.00mm	42.00t	44.00mmpp	43.00*	57.00t	48.25bll	25.00rr
Straight hard	"	33.25uu	41.00	38.00jj	58.00p	34.00	49.00jk	48.00ggtt	53.00	54.00	54.00pmm	34.00	44.00	58.00ype	55.00	.....	45.00mm	40.00t	45.50pp	43.00*	71.00t	56.30bll	60.00rr
LIME, in paper, Hyd. fin.	ton	42.50bh	35.80	38.28mm	42.00§	1.00aall	29.20jmm	32.75ptt	38.36	48.00p	38.00mm	36.26	38.00nnll	47.20bbe	48.00p	46.00p	40.00mmp	30.00t	1.00aapp	29.24	52.00bbt	39.00	34.00mm
" " , Com hyd.	"	35.50hh	23.40	20.87mm	34.00§	0.90alaa	29.20jmm	28.00ptt	23.32	44.00p	30.00mm	34.26	38.00nnll	40.00bbe	32.00p	40.00p	24.00	26.00t	0.80aapp	29.24	38.00bbt	22.00	36.40mm
" " , pulverized	"	.....	.....	26.33gmm	.....	.....	29.20jmm	.....	26.00	46.00p	40.00mm	29.76	39.00nnll	48.00bbde	.....	.....	27.00	34.00t	1.35zaapp	31.74	1.30mbbt	13.25	34.75mm

*§ F.o.b. yard. **† F.o.b. plant Stockton *† F.o.b. yard Roxbury. *a Smooth. *b $4.50 del. *c 8 x 12 x 12 in.–6 cell. *d Pulverized hot. *e less 5% disc., 10th. *f 8 x 8 x 12. *g Lumps, $26.72. *h F.o.b. trucks, job site N.Y.C. *i 60 lb sacks. *j Truck load or over. *k $1.00 discount per M, 10 days. *m Per bb. 180 lb. processed. *n 7¾ x 7¾ x 12. *o Mason's double hydrated pressure. *p Truck lots. *q Provincial and Municipal tax extra (6%). *r Not used: earthquake danger. *s 8 x 16 x 12. *t less 2% disc., cash. *u Incl. Federal tax. *v Sand lime. *w 5 x 8 x 12. *x dumped. *y Chi common. *z Pebble; 80 lb sack. *aa 50 lb sack. *bb LCL. *dd 6 x 12 x 12. *ff 80% common. *gg Smooth. *hh less 25¢ disc., cash. *ii F.o.b. plant. *jj rough *kk 3½ x 11½ x 11½. *ll less 2% disc. 10th. *mm less 2% 10 days. *nn F.o.b., L. A. *oo less 2% 30 days. *pp add 2% sales tax. *qq 8 x 5½ x 11½. *rr 2½% disc., 10 days. *ss 5% disc., 10 days. *tt less 2% disc., 15th. *uu less 50¢/M, 10 days. *vv 4000 pcs. and over. *ww New manufactured in perodic instead of tunnel kiln.

PAINT, ROOFING—F. O. B. CARLOAD LOTS

Item	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis K	San Francisco	Seattle	Montreal	Toronto
LEAD, red, dry	CWT	$14.10ggJO	$17.50pp	$26.00†J	$24.95†oomm	$15.25rjqqpp	$15.25†JO	$25.65†	$22.50	$23.85n	$15.95r	$33.15ggool	$16.25yy	$15.25N	$23.00Jpp	$14.75ocO	$14.75mmO	$21.50mggJ	$25.65†m	$26.70mm	$13.35HO	$19.45O	$13.95
White, in oil	"	24.00ggJ	24.00	29.00†J	26.90†mmm	24.00†J	24.00†J	26.90†	23.50M	24.00	24.00rr	28.65	22.00	21.50kk	24.00J	29.75	19.00mm	24.00J	26.90	26.90mm	24.00H	26.00wtt	21.65
READY-MIXED PAINT																							
Graphite b.	gal	....	3.00	3.90J	.....	.....	.....	3.36ggP	.....	3.70	....mm	4.04	3.30	.....	.....	.....	3.35mm	2.20#EJ	.....	3.20mm	.....	5.52Dfft	5.15J
Aluminum	"	4.10	4.40	3.40J	.....	.....	.....	3.64zzgg	3.25B	5.10	....mm	3.48	4.50n	.....	.....	.....	3.90mm	2.25#FJ	.....	4.30mm	4.19ceffJ	6.55xff	6.18J
Ferric Oxide	"		3.50	.....	.....	.....	.....	4.29qgg	.....	.....	....mm	3.06	4.20n	.....	.....	.....	3.65mm	2.25#GJ	.....	3.50mm	.....	5.10kfft	5.95J
ROOFING SUPPLIES	square	3.15kk	3.06	2.95†mm	3.55q	3.45ukk	2.99mm	3.05q	3.00u	2.94	2.85mm	3.21mm	3.40nkk	2.85kk	$2.78	2.60xx	.....	2.90eH	2.99iimm	2.87mm	3.34ccH	5.40	2.90
Rolls, slate surf.	CWT	2.30kk	3.67	2.17ii†mm	2.60q	2.75okk	2.20mm	2.25o	2.75o	2.25o	2.10omm	2.68omm	2.40njkk	2.10hikk	1.98	1.90xxo	2.65	2.15eH	2.54hh	1.72aaiimm	2.89hccH	4.65f	2.15aae
Asphalt felt	"	2.58	4.04	2.17ii†mm	3.04q	3.15okk	2.65omm	2.55o	2.75o	2.80o	2.55omm	2.68omm	.....	2.55bikk	2.85	2.29o	2.55	2.15H	3.07hh	2.59mm	.....	4.65f	2.15o
Asphalt coating	gal.	0.72kk	0.50	0.76fffmm	0.55q	48.00bbkk	0.56ymm	0.41y	0.47o	0.50f	0.56fffmm	0.59y	0.75nykk	0.52ikk	0.68	0.52z	0.74	0.56H	0.50–0.55y	0.46jj	0.66cc	1.60	0.63j
Tar pitch	ton	49.00	54.00	48.00eemm	60.00	57.70†kk	57.96Hmm	49.00gg	65.00hh	50.00	49.00mm	.....	s.....	50.00rkk	45.50	49.00*	49.00	55.00H	57.60	54.00	.....	4.40uu	48.00A

*† Delivered. * Note: Red lead in oil 50% higher than white lead in oil. ** Aver. wt. approx. 425 to 550 lb drums. *a Red lead prices change frequently due to pig lead price changes. *b U.S. War Dept. Spec. 3-49A. *c ASTM Spec. D266-31. *d 80% minimum ferric oxide. *e Per 108 sf roll. *f Per 432 sq ft. *g F.o.b. yard Roxbury. *h Per roll, 65 lb. *i Net carload prices, Minneapolis and vicinity. *j 45 gal containers. *k Over 80% ferric oxide. *l Not used. *m 100 lb keg. *n F.o.b. city. *o Per 60 lb roll. *p 6-drum, 50 gal each. *q Per 90-lb roll. *r F.o.b. factory, Chicago. *s Truckload. *t Incl. Federal tax. *u Per 90-lb square. *v Per ton. *x Ready-mixed. *y 55-gal container. *z Drums. *aa 15 lb. *bb Roofers coating and cement. *cc LCL, truck delivery. *ee Asphalt pitch in 100 lb package. *ff 5-ga drums. *gg F.o.b. Cleveland factory. *hh Incl. freight. *ii Per 324 sf roll. *ii Asbestos roof coating. *kk less 2% disc., 10th. *mm less 2% disc., 10 days. *oo 100 lb bbls. *pp 50 or 100 lb bags. *qq 500 lbs or more. *rr F.o.b. plant, Detroit. *ss 50 lb bbls. *tt 25 lb kegs. *uu 250 lb bbls. *xx Sept.: Rolls revised to $2.75, Asph. Felt revised to 1.71. *yy Sept. revised to $12.00. *zz Sept. revised to $2.80. *A 400 lb barrels. *B ASTM Spec. D962-49. *C 95%. *D Std. black. */ Milt. spec.: *E TTP27; *F TTY81; *G TTP31. *H less 2% disc., cash. *I Per 100 lb. *J less 1% disc., 10 days. *K add 2% sales tax. *L CL. *M 1 ton or more. *N under 500 lbs, add $1. *O 50 lb. bag

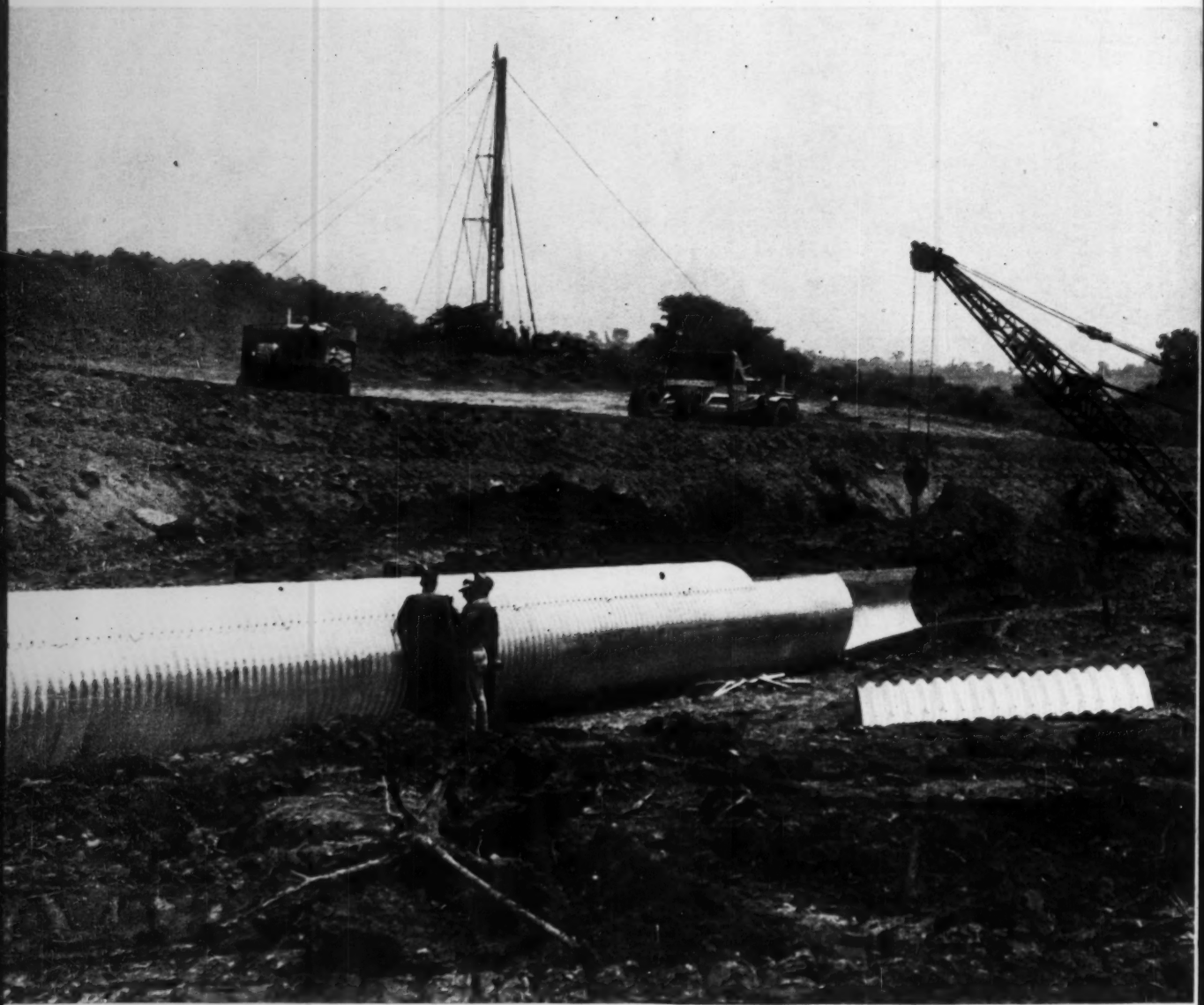
PLASTER, VERMICULITE AND METAL BUILDING SHEETS

Item	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis uu	San Francisco	Seattle	Montreal	Toronto
PLASTER, neat	ton	$33.00ss	$24.00	$37.00ss	$26.00	$1.45bbtt	$24.95*ss	$29.00*ss	$32.80	$29.00	$28.00ss	$30.00	$28.00tt	$34.50F	$34.00	$27.00	$26.25	$30.00nn	$30.00	$29.50ss	$42.40nn	$22.60h	$32.00
gauging	"	45.00ss	35.70	43.00ss	30.00	1.45bbtt	24.95*	45.00N	35.60	29.00	28.00ss	35.00	29.00tt	34.50F	42.00	35.00	31.00ss	31.00nn	43.00	30.50ss	45.60nn	35.60h	50.00
VERMICULITE																							
Home insul. pellets	4 cf bag	1.65sss	0.95	1.55ss	1.40	1.55	1.75*ss	1.39ss	1.05	1.63	1.27ss	1.24E	1.25	1.65tt	1.38P	1.35	1.50ss	1.25nn	1.55	1.38ss	1.55nn	1.25h	1.47bb
plaster agg.	"	1.65sss	....	1.55ss	1.40	1.60	1.75*ss	1.34ss	1.21	1.40	1.31ss	1.26E	1.20kttt	1.80F	1.36P	1.38	1.45ss	1.30nn	1.60	1.38ss	1.35knn	1.40h	1.43bb
concrete agg. treated	"	1.85sss	....	1.60ss	1.40	1.60	1.85*ss	1.45ss	1.37	1.50l	1.40ss	1.34E	1.45	1.95Fl	1.42P	1.50	1.55ss	1.40mm	1.65	1.50ss	1.85lnn	1.60h	1.66bb
PERLITE, plaster agg.	"	1.65ss	1.15	1.27ss	1.55ss	1.60	1.75ss	1.45ss	1.21	1.50ss	1.45kii	1.26	1.16	1.40S	1.15P	1.45	1.30ss	1.40nn	1.55	1.38oss	1.50k	1.15v	1.14Q
concrete agg. untreat.	"	1.65ss	1.55	1.27ssl	1.55ss	1.60	1.75ss	1.45ss	1.32	1.60ss	1.50kii	.....	1.26	1.50S	1.25P	1.40	1.40qqss	1.40nn	1.60	1.58oss	.....	1.15v	.....
BUILDING SHEET																							
Alum. flat, .100"	lb	0.469noo	0.469	0.459M	0.474	0.514x	0.469	0.449aa	0.459	0.479	0.469a	0.469	0.449	0.459	0.469	0.479aT	0.464	0.475	0.469	0.575	0.50D	43.95AH	0.4375
corr. roof, .032"	sheet	9.86nY	0.451r	9.66K	25.07AAp	33.10p	9.35	24.51p	0.463	10.89	9.35a	26.74ggyyp	8.77Z	10.09	33.43	25.54aXAA	8.86	10.39	9.56	10.83	11.25D	12.10H	26.00ap
Stainless steel, 20 ga.	CWT	61.25nxx	58.19	64.50K	62.66ddxx	58.34ee	56.66xx	58.50ooxx	60.50	65.32gg	58.35axx*	67.50E	60.11	63.61GR	59.19Y	62.33a	58.86	63.00	61.64Kmmgg	65.00K	60.10D	65.75H	73.74
28ga.	"	71.25nxx	67.69	73.00K	72.67dd	67.84ee	65.91xx	68.00ooxx	83.50	73.57gg	67.85axx*	76.25E	69.61	69.61ffG	68.69Y	72.33	68.36	74.50pp	71.64ygg	77.25K	69.60D	.....	86.52

*‡ trucklots, delivered *† fob warehouse. ** fob city. *a delivered. *b ½" O.D. *c ⅝" O.D. *d per sf. *e 34" x 80" sheet. *f per 100 ft. *g 5 tons & up: cold roll, anneal & pickled 2B finish. *h Incl. Federal tax. *i add 25¢ for pint of additive. *j 1100 & 3003 alloy, mill finish. *k bag of 3 cu ft. *l treated with air entraining agent. *m 2-10M ft. *n fob mill fr equalized with nearest stocking competitor. *o 250 sacks or more. *p 100 sq ft. *r per lb. *s 30 lb bag. *t 36" x 108";-10.81 lb/sh; 48" x 144";-21.7 lb/sh. *u 19.31 lb/sh. *v fob plant. *w 48" x 144". *x 0.11"th. *y 27 gauge. *aa 18M lb & up. *bb Per 50 lb bag. *dd add $1.00 cwt boxing. *ee 4 tons & up. *gg add $2/cwt boxing; $0.75/cwt on skids. *hh Theoretical wt for 48" x 96"; 60.4-lb per sh. *ii 300-bag lots. *jj 100-lb bag. *mm Theoretical wt; 19.7-lb per sh. *nn 2% cash. *oo skid packed. *pp type 304. *qq Philadelphia and suburbs. *rr less 2% disc. 15 days. *ss less 2% disc. 10 days. *tt less 2% disc. 10th. *uu add 2% sales tax. *vv Type N. *xx less ½% disc. 10 days. *yy .021 ga. *zz .061" th. *A Per 100 lb. *C 15M lb. *D less ½% for cash. *E Quantity differential. *F less 5% disc. 10th. *G less ½% disc. 10th. *H Fed. tax exempt. *K less ½% 10 days. *L 5% disc. 30 days. *M 3003; .452 for 1100. *N less 2% 15th mo. *O less $2, cash & carry. *P less 2% 15 days. *Q per ton. *R revised. *S add .10/bag under 200 bags. *T 5000# quantity on 4000# skids. *U 30 Msf quantity; $0.245 in 10 Msf quantity. *X per sq ft. *Y per sheet. *Z 6,000 lb or over. *AA 30,000 sf or over.

. . . . . they're building a "runway"

This 840-ft. installation of 60" USS AMBRIDGE Sectional Plate pipe culvert is being built beneath the runway at the Washington, Pa. Airport. It will drain a stream that runs through a ravine under the landing strip. Workmen aren't wasting a bit of time putting it in. All they do is smooth the grade line, lower the plates into place, bolt them together and backfill. Nobody sits around waiting out expensive curing time and nobody had to put up or tear down forms.



under the airport

USS AmBridge Sectional Plates are strong. They won't crack or break. They are highly corrosion-resistant because they are fabricated from tough copper-bearing steel, corrugated and zinc coated. They are available in a complete range of sizes and meet all federal and state specifications. Solve your drainage problems with American Bridge Highway Products. Contact one of our offices for literature and information.

USS and AmBridge are registered trademarks

American Bridge Division of United States Steel

General Offices: 525 William Penn Place, Pittsburgh, Pa.
Contracting Offices in: Ambridge • Atlanta • Baltimore • Birmingham Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit Elmira • Gary • Harrisburg, Pa. • Houston • Los Angeles • Memphis Minneapolis • New York • Orange, Texas • Philadelphia • Pittsburgh Portland, Ore. • Roanoke • St. Louis • San Francisco • Trenton • United States Steel Export Company, New York

Many hours of installation time are saved because USS AmBridge Sectional Plates can be easily bolted together.

USS AmBridge Sectional Plates are heavily galvanized for long life. Some have been in the ground for 30 years and still look almost new.

(Left) A crane lowers a USS AmBridge Sectional Plate culvert quickly into place. Backfilling will complete the installation.

Contractor—Indyke Construction Co., Houston, Pa.
Consulting Engineer—Michael Baker, Jr., Inc., Rochester, Pa.

This mark tells you a product is made of modern, dependable Steel.

Labor and Materials Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES.

- Cement, Aggregate, Ready Mixed Concrete, Asphalt: Last, Nov. 11; next, Dec. 7.
- Wood Products, Glass, Explosives, Chemical: Last, Nov. 23; Next, Dec. 21.
- Iron & Steel Products, Pipe: Last, Nov. 16; Next, Dec. 14.

HOURLY WAGE RATES—Base rate + fringe benefits

Classification	Atlanta $ + ¢	Baltimore $ + ¢	Birmingham $ + ¢	Boston $ + ¢	Chicago $ + ¢	Cincinnati $ + ¢	Cleveland $ + ¢	Dallas $ + ¢	Denver $ + ¢	Detroit $ + ¢	Kansas City $ + ¢	Los Angeles $ + ¢	Minneapolis $ + ¢	New Orleans $ + ¢	New York $ + ¢	Philadelphia $ + ¢	Pittsburgh $ + ¢	St. Louis $ + ¢	San Francisco $ + ¢	Seattle $ + ¢	Montreal $ + ¢	Toronto $ + ¢
COMMON LABOR																						
Building	2.00	2.30+7½	2.10	2.90+10	3.225+7½	2.90	3.52	1.95	2.47	3.00+34	2.705	3.26+10	3.00	2.00	3.65+292	2.70+15	2.85+25	3.025+10	3.225+10	3.00+25	1.82+4	2.05+8
Heavy Const.	2.00	2.30+7½	2.10	2.75+10	3.225+7½	3.025	3.435	1.95	2.42	3.00+34	2.755	3.26+10	2.98	2.00	3.65+292	2.70+15	2.715+20	3.025+10	3.225+10	3.00+25	1.82+4	2.05+8
SKILLED BUILDING TRADES																						
Bricklayers	4.05	4.10+15	4.15	4.20+30	4.40+10	4.125+14	4.085+25	4.15	4.15	4.09+34	4.20	4.35+25	4.025+15	3.82+7½	5.20+62	4.40+17	4.60+20	4.25+33	4.40+42½	4.30+30	2.65+6	3.30+13
Carpenters	3.45	3.725+7½	3.40	3.85+10	4.08+20	3.95	4.11+15	3.55	3.80e	3.75+47	3.75	4.00+20	3.68+15	3.40+075	4.75+38	4.00+20	4.225+20	4.075+104	3.95+36	3.53+20	2.45+5	3.05+12
Struct. Iron Workers	3.70+7½	4.10+20	3.77+13	4.26+20	4.55+16	4.025+105	4.16+10	3.675+8	3.91+10	4.10+27½	3.99	4.50+3.55	3.77+15	3.70+10	5.05+706	4.60+23	4.375+29	4.075+104	4.50+35	3.92+10	2.65+6	3.05+12
Plasterers	3.50+3	3.85+10	3.47	4.00+45	4.17+27	3.925+1	4.16+10	3.937+10	3.975+15	3.87+41	4.00	4.25+55	3.80+33	3.12+5	4.95+67	4.30+20A	4.345+20	4.10+7½	4.29+63	3.87+32	2.65+6	3.20+21
Electrical Workers	4.15+5	3.85+10	3.925	4.10+25	4.50	4.29+52	4.29	3.775+7½	4.20	4.11+52	4.30+43	4.90+49	3.85+44	4.00+7½	4.40+26	4.675+18	4.60+31½	4.26+52	4.38+37	4.025+26	2.60+5	3.60+19
Steamfitters	4.00+25	3.96+18	3.85+22	4.15+29	4.25+25	4.10+215	4.06+20	3.825+11	4.10+12	3.90+51	4.00+295	4.58+68	3.77+38	3.90+7½	4.80+772	4.35+32	4.15+20	4.425+25½	4.57+76	4.14+29	2.72+6	3.51+20
EQUIPMENT OPERATORS																						
Hoisting Engineers	3.88	4.10+20	3.45	4.15+35	4.05+05	3.90A	4.26	3.70	3.40	3.74+39½	3.72	4.01+25	3.75	3.525+7½	4.90+39	4.50 4.205 +275A	3.82+20	4.175	4.00+35	3.91+20	2.45+5C	3.25+13
Tractor Operators (B)																						
34–49 hp	3.25	3.70+20	3.45	3.575+35	3.80+5	3.675+10	4.01	2.625	2.65	3.74+39½	3.025	4.31+25	3.36	3.525+7½	4.375+35	3.78+275	3.82+20	4.175	4.23+35	3.91+30	2.05+4C	2.50+10
70–100 hp	3.25	3.70+20	3.45	3.575+35	3.95+5	3.675+10	4.01	2.625	3.25	3.74+39½	3.475	4.31+25	3.60	3.525+7½	4.375+35	4.03+275	3.82+20	4.175	4.23+35	3.91+30	2.28+5	2.60+10
Over 100 hp	3.25	3.70+20	3.45	3.575+35	3.85+5	3.675+10	4.01	2.625	3.25	3.74+39½	3.475	4.31+25	.....	3.525+7½	4.375+35	4.03+275	3.82+20	4.175	4.23+35	3.91+30	2.28+5	2.60+10
Tractor Scraper, 15–16 cy	3.25	3.70+20	3.45	3.575+35	3.85+25	3.675+10	4.01	2.625	3.25	3.74+39½	3.475	4.41+25	3.60	3.525+7½	4.50+36	4.03+275	3.82+20C	4.175	4.36+35	3.91+30	2.28+5	2.60+10
Power cranes & shovels																						
½ cy	3.78	4.10+20	3.45	4.00+35	4.40+5	3.675+10	4.16	3.425	3.40	3.74+39½	3.72	4.41+25	3.82	3.525+7½	5.25+420	4.50+275	4.02+20	4.175	4.67+35	4.28+30	2.55+5	3.10+12
¾ cy	3.78	4.10+20	3.45	4.00+35	4.40+5	3.90+10	4.16	3.425	3.40	3.74+39½	3.72	4.41+25	4.08	3.525+7½	5.25+420	4.50+275	4.02+20	4.175	4.67+35	4.28+30	2.55+5	3.25+13
Motor grader operator	3.25	3.25+20	3.45	4.00+35	3.85+5	3.90+10	4.01	2.625	3.25	3.74+39½	3.72	4.41+25	3.36	3.525+7½	4.50	3.93+275	4.02+20	4.175	4.44+35	4.00+30	2.28+5	2.90+11
Air Comp. operator	3.60	3.30+20	3.45	3.55+35	3.70+5	3.90+10	3.91	2.10	3.25	3.74+39½	3.475	3.53+25	3.25	2.78+7½	4.50+35	3.63+275	3.53+20	3.625	3.67+35	3.64+30	2.15+5	2.60+10
Air tool operator	2.22	2.325+7½C	2.25	2.80+10	4.00+5	3.90+10	3.885	2.10	2.75	3.13+34	2.80	3.47+10	3.30	2.105	4.10+192	2.70+10	2.825+20	3.625	3.655+10	3.35+10	2.15+5	2.60+10
TRUCK DRIVERS																						
1½ Ton	2.10	2.27+075	2.10	2.85+23	2.68+21	2.70+11	3.07+15	2.625	2.70	3.11+18	2.68	3.575+10	2.98	3.525+7½	3.275+28	2.82+18	2.75+20C	3.05+15	3.38+21	3.50+30	1.85+4	2.15+15
Under 4 cy	2.20	2.27+075	2.30	2.85+23	2.68+21	2.75+11	3.07+15	2.625	2.85	3.11+18	2.68	3.575+10	2.98	3.525+7½	3.275+28	2.82+18	2.735+30	3.25+15	3.253+21	3.50+30	1.85+4	2.15+15
Over 4 cy	2.50	2.27+075	2.70	2.85+23	2.68+21	2.80+11	3.07+15	2.625	3.05	3.11+18	2.755	3.765+10	3.13	3.525+7½	3.275+28	2.82+18	2.835+20	3.35+15	3.413+21	3.70+30	1.85+4	2.15+15

ENR Skilled Labor Average (Bricklayers, Carpenters, Iron Workers): $4.246. ENR Common Labor Average $2.871 Description of fringe benefits last appeared Sept. 21 1961. *A 2 drum. *B Including Bulldozers

BUILDING BOARD & LATH AND INSULATION—DELIVERED TRUCKLOAD LOTS

	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles Q	Minneapolis F	New Orleans	New York	Philadelphia H	Pittsburgh	St. Louis HO	San Francisco	Seattle	Montreal	Toronto
GYPSUM BOARD & LATH																						
Plaster board, ½"	$62.50F	$54.00	$63.00H	$61.00mH	$67.50	$53.50swH	$64.00CF	$57.50	$64.50H	$66.00K	$72.00H	$67.00F	$68.00	$57.00H	$70.00H	$53.50	$74.00K	$56.50 /67.50	$60.00	$74.25K	$58.00M	$58.00
" " ⅜"	52.50F	47.50	52.00H	51.00mH	54.50	43.85swH	57.50CF	47.50	54.00H	56.00K	62.00H	60.50F	58.00	48.00H	56.00H	45.50	65.00K	51–56HO	49.00F	62.00K	50.00M	52.00
Board lath, ⅜"	42.50F	35.75	47.77H	36.00mH	45.00	33.05swH	40.00CF	43.50	42.00H	42.45K	45.00H	0.34F	0.41xL	40.00H	44.50H	37.50	40.00K	40.00HO	0.36xF	54.00K	39.42.00M	41.00L
SHEATHING																						
Gypsum T & G, ½"	62.50F	55.70	75.00H	56.00mH	62.50	51.16wH	53.75CF	57.50	66.75H	66.00K	.....	64.50F	67.00	57.00H	60.00H	52.00	63.00K	67.00HO	61.00F	73.00K	54.00M	70.00
Fiber board, ½", sq. e	72.00F	65.00	67.50H	65.00H	87.00	65.00swH	84.50CF	68.75	62.50H	57.00DK	75.00H	75.00F	100.00	67.00H	78.00	64.00	60.00K	65–75HO	70.00F	98.50K	63.00M	61.50T
" " 25 32", T & G	.....	108.50	140.50H	120.00H	123.00	125.00swH	131.00CF	118.00	107.50H	89.18DK	122.00H	125.00F	135.00	140.00H	124.00	110.00	100.00K	115/120	111.00F	98.50K	.....	.....
INSULATION																						
Fiber board, sq. e., ½"	75.00F	69.00	83.50H	79.00hnH	87.00	72.50swH	88.00CF	68.75	75.00	62.50DK	80.00H	80.00F	81.00	80.00H	78.00	67.00	60.00K	75–80	69.00F	71.00K	73.00M	71.00T
Min. wool, loose	1.08z	1.40F	1.40	1.70bH	1.85	1.45swH	1.35	1.50	1.55b	1.30b	1.40H	76.00BeF	1.75v	2.25L	1.55b	1.10	1.25sK	125/135	1.75F	1.25tK	1.35M	1.85
" " 3" batts	67.80F	67.50	70.00	75.00H	80.00	60.00swH	70H	65.00	65.00ab	52.00	75.00H	83.00F	70.00	70.00*	68.50k	47.00	55.00K	60/70	66.50F	58.00K	60.00M	61.00
Glass fiber, loose	1.45	1.60F	2.00	.....	.....	1.45swH	.....	1.50	2.00b	1.85b	1.80H	1.35s	1.75	.....	.....	1.10	1.25sk	2.00P	1.75F	1.85*pK	1.35M	.....
" " 3" batts	48.00F	47.00F	65.00	75.00H	63/65	60.00swH	62.50	65.00	65.00a	80.00	75.00H	64.00	70.00	.....	68.50	47.00	55.00K	68.50	66.50F	59.25*1Kh	60.00M	61.00
Aluminum foil, 1 side	3.62qi	4.00F	3.77gG	5.30xHS	5.25	3.02jwJ	14.00noJ	5.00gAG	5.25	.....	3.80d	4.20g	3.50	6.50	4.38sH	2.90	4.25igK	4.39ig	5.10	6.50K	9.00qM	15.50o
" " 2 layers	.....	33.50F	.....	53.50qH	.....	66.00wJ	55.00J	45.00	48.65	.....	60.00	7.50V	.....	.....	40.00eH	83.50	38.50K	.....	40.00eH	45.00EK	56.00M	46.00

*• F.o.b. warehouse. *a Semi thick. *b 30¢ bag. *c 3 layers of foil; $54.50. *d 40¢ kraft paper, 5 Msf, 100–500 rolls. *e 20¢ sq ft bag, 4" thick. *f Full trailer loads. *g 80¢ kraft paper backing 400 rolls or over. *h LCL. *i 40¢. *j 80¢. *k 2-in. *l 2". *m 8 to 10 ton quantities. *n Distributor's siding. *o Per Msf roll. *p 32¢ bag. *q 500 sf. *s 35¢ bag. *t 28¢ bag. *u Flame proof $75. *v 5000 sf quantity. *w F.o.b. city. *x Sq. yd. *y 30¢ bag. *z Spun rock wool. *A 650 sf. *B ton *C F.o.b. plant, freight allowed. *D CL. *E 10 Msf. *F Less 2% disc, 10th. *G ½ of 1%, 10 days. *H 2% disc, 10 days. *J 1% disc, 10 days. *K Less 2% for cash. *L 5% disc, 10th mo. *M fed. tax incl. *N 1% disc, 10 days. *O add 2% sales tax. *P 50 lb. bags. *Q add 4% sales tax *R revised. *S 45 lb. *T less 2%, 30 days. *U lots of 2606 sq. ft. *V 250 sf roll.

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WAGES, av per week, 8 hr day (pesos) 6 days work-extra day's pay

Common labor, building (peons)		101 50
	heavy const (peons)	136 50
Skilled labor;	carpenters 1 cl	210 00
	bricklayers 1 cl	245 00
	struct, ironworkers	315 00

MATERIAL PRICES, F.o.b. City (pesos)

Struct. steel shapes, fob Monterrey		
I-beams, 3 x 3 x 4"	per metric ton	1980.10
Reinf. steel, corrugated rods, per ton		
⅜"–½" x 11 meters consolidada		1875-1950
¾"–1" x 11 meters		1750 00

Gravel, truckload, per cu meter		
Blue gravel		30 00
Cement, std. port. (Tolteca)	per metric ton	260 00
Lumber, 2" x 4" 1st class pine 20 ft.	per M sq. ft.	3000 00
2" x 4" 2nd class pine	per M sq. ft.	2300 00

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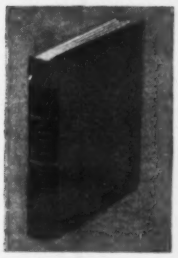

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Construction Reports

Bids Asked—Low Bidders—Contracts Awarded

NEW ENGLAND

BUILDINGS—LB & CA

▲ **Green Manor Constr. Co., Inc.,** 382 Middle Turnpike West, Manchester, Conn., LB **$2,538,300,** SENIOR HIGH SCHOOL, WARWICK, R. I. City, School Bldg., Comm., 1849 Warwick Ave., Warwick, R. I. BA 11/5/61. CD 11/9/61.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ **Md., Towson**—BA 12/5—Baltimore Co. Bd. Educ., Aigburth Rd., Zone 4, 1 and 2 story, brick, concrete, steel, block Perry Hall JUNIOR HIGH SCHOOL. $2,500,000. Plans deposit $60. Fisher, Nes, Campbell & Assoc., 2120 N. Charles St., Baltimore, Zone 18, archts. CD 12/21/60.

▲ **N. Y., New York**—BA 12/19—New York City Housing Auth., 299 Broadway, New York, Zone 7, (1) fdns. and general constr., (2) heating and ventilating, (3) electric work and (4) plumbing for DE WITT CLINTON HOUSES, Proj. NY 5-45, E. 110 St., Lexington Ave., E. 108 St. and Park Ave. and E. 106 St., Lexington Ave., E. 104 St. and Park Ave., excluding certain portions in latter area as more fully shown on drawings, Manhattan Boro. $11,000,000. Plans deposit $75. CD 8/25/61.

BUILDINGS—SLC

▲ **N. J., Englewood**—Bd. Trustees Englewood Hospital, 350 Englewood Ave., soon lets contract WEST WING HOSPITAL ADDN. $3,500,000. Ferrenz & Taylor, 1451 Broadway, New York, N. Y., archts. Sears & Kopf, 200 Madison Ave., New York 16, N. Y., mech. engrs. Severud, Elstad & Krueger Assoc., 415 Lexington Ave., New York 17, N. Y., struc. engrs. Harry Handwerger, 155 E. 42nd St., New York 17, N. Y., elec. engr. CD 10/20/61.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, ROAD.

Tully & DeNapoli, Inc., 127-50 Northern Blvd., Corona 68, N. Y., CA **$6,780,593,** est. $7,781,000, 8 in. bit. conc. pavt. 0.87 mi., misc. work 0.12 mi. 3 HGS welded comp. beam 101 ft., 100 ft., 100 ft., Grand Central Pky. Sect. 3, Contr. 2, 150 St. to 172 St. - FAGDP 61-3, Proj. U-629(2), Queens Co. BA 10/5. CD 10/6/61, under LB.

BUILDINGS—LB & CA

▲ **Frouge Constr. Co., Inc.,** 680 5 Ave., New York 22, N. Y., CA **$5,067,000,** fdns. and general constr. Jonathan Williams HOUSES, Proj. NYS-101, Marcy Ave., Division Ave., Roebling St. and Broadway, Brooklyn Boro, BROOKLYN, N. Y. New York City Housing Auth., Rm. 312, 299 Broadway, New York 7, N. Y. Grand total $6,324,900. BA 9/26. CD 9/28/61, under LB.

H. Sand & Co., 250 W. 57 St., New York 19, N. Y., CA **$548,000,** heating and ventilating Jonathan Williams HOUSES, (Brooklyn, N. Y.).

Lipsky & Rosenthal, Inc., Madison Ave. and E. 112 St., New York 29, N. Y., CA **$709,900,** plumbing work Jonathan Williams HOUSES, (Brooklyn, N. Y.).

▲ **Frank Wilkinson, Inc.,** 15-35 123 St., College Point, N. Y., CA Est. **$3,000,000,** 5 story, 140,000 sq. ft. steel frame HOSPITAL, KEW GARDENS, N. Y. Kew Gardens General Hospital, 80-02 Kew Gardens Rd., Kew Gardens, N. Y. Theodore L. Soontup, 118-14 Queens Blvd., Forest Hills, N. Y., archt. Meyer Dorfman, 26-15 Parsons Blvd., Flushing, N. Y., struct. engr. Mayer Assocs., 110 E. 30 St., New York 16, N. Y., mech. engrs.

▲ **Wark & Co.,** 1920 Sansom St., Phila., Pa., CA **$4,000,000,** HOSPITAL BOILER PLANT, Langdon and Sanger Sts., PHILA., PA. American Federation of Labor Hospital Assn., 253 N. Broad St., Phila., Pa. Ellerbe & Co., 333 Sibley St., St. Paul, Minn., archts. CD 9/21/61, under LB.

▲ **Gage & Martinson, Inc.,** 11th and Market Sts., Phila., Pa., CA **$2,700,000,** PARKING GARAGE and STORES, 11th and Market Sts., PHILA., PA. Jackbilt, Inc., 430 Central Ave., Cedarhurst, N. Y. Joseph S. Ward & Assocs., Inc., 91 Roseland Ave., Caldwell, N. J., engr.

▲ **E. Eyring & Sons,** 808 N. Conkling St., Baltimore 24, Md., CA **$2,424,000,** Patapsco Neck SENIOR HIGH SCHOOL near Essex, TOWSON, MD. Baltimore Co. Bd. Educ., Aigburth Rd., Towson 4, Md. Smith & Veale, 2127 N. Charles St., Baltimore 18, Md., archts. CD 11/3/61, under LB.

SOUTH

BUILDINGS—SLC

▲ **S. C., Charleston**—Roper Hospital, 310 Calhoun St., Charleston, soon lets contract HOSPITAL ADDN. $2,500,000. Lockwood Greene Engineers, Inc., Montgomery Bldg., Spartanburg, archt. CD 10/20/61.

HEAVY CONSTRUCTION—LB & CA

▲ **Johnson, Drake & Piper, Inc.,** 3350 Peachtree Rd. N.E., Atlanta, Ga., LB **$3,363,424,** INCINERATOR, S. Cobb Dr., ATLANTA, GA. City, City Hall, Atlanta, Ga. BA 11/13/61. CD 10/24/61.

▲ **KENTUCKY**—Commonwealth Ky., Dpt. Hys., Frankfort, ROADS.

Ky.—**Green Constr. & Coal Co.,** Oaktown, Ind., CA **$2,482,802** combination 7.622 mi. West Kentucky Turnpike, WK 6-1-2, Butler, Grayson and Ohio Counties. CD 11/24/61, under LB.

Ky.—**Ralph Rogers & Co.,** S. Adams St., Bloomington, Ind., CA **$1,143,412,** 7.784 mi. grading West Kentucky Turnpike, Wk 8-2, Hardin Co. BA 11/10. CD 11/14/61, under LB.

BUILDINGS—LB & CA

▲ **H. L. Coble Constr. Co.,** P.O. Box 3328, Greensboro, N. C., CA **$2,553,400,** NURSING HOME for AGED PERSONS, CHARLOTTE, N. C. Methodist Homes, 3420 Shamrock Dr., Charlotte, N. C. BA 11/15/61. CD 10/3/61.

▲ **H. W. Ivey Constr. Co.,** 3330 Peachtree Rd., NE, Atlanta, Ga., LB **$3,238,000,** 200 units, 21 story, Phoenix Towers APARTMENTS, ATLANTA, GA. Phoenix Investment Co., c/o James C. Wise, Simpson, Aiken & Assocs., archts., 873 Springs St., NW, Atlanta, Ga. BA 11/16/61. CD 11/13/61.

▲ **Algeron-Blair Constr. Co.,** Box 749, Montgomery, Ala., CA **$2,200,000,** STUDENT HOUSING, Mississippi State University, STATE COLLEGE, MISS. State Bldg. Comm., 1503 Woolfolk State Office Bldg., Jackson, Miss. BA 10/10, CA 11/9. CD 10/16/61, under LB.

MIDDLE WEST

BUILDINGS—LB & CA

▲ **The George Sollitt Constr. Co.,** 109 N. Dearborn St., Chicago 2, Ill., Total est. CA **$4,500,000,** 152-bed HOSPITAL, SKOKIE, ILL. Skokie Valley Community Hospital, c/o Schmidt Garden & Erikson, archts., 104 S. Michigan Ave., Chicago 3, Ill. BA 11/1/61. CD 10/19/61.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲ **Oklahoma** — BA 12/19 — Grand River Dam Auth., Vinita. Contract No. 1, MARKHAMS FERRY DAM and POWERHOUSE on Grand River, $15,000,000, Plans deposit $50; Contract No. 3, four 30,000 KVA VERTICAL SHAFT ELECTRIC GENERATORS for Markhams Ferry Powerhouse, $3,900,000. Plans deposit $25. W. R. Holway & Assocs., 1850 S. Boulder St., Tulsa, engrs. CD 11/29/45.

BUILDINGS—LB & CA

▲ **J. E. Morgan & Sons,** Box 6029, Dallas, Tex., LB **$2,140,540,** est. $1,750,000, (8 bidders), 2 story, bsmnt., 62,000 s.q. ft., masonry steel frame, OFFICE, Mookingbird Lane, Hine Blvd. and Treadway St., DALLAS, TEX. Great National Life Insurance Co., 1604 Main St., Dallas, Tex. BA 11/8/61. CD 10/24/61.

FAR WEST

HEAVY CONSTRUCTION—BA

▲ **Calif., San Diego**—BA 12/13—City, Rm. 161, Civic Center Bldg., Zone 1, constr. portion INTERCEPTOR SEWER, Contr. 2, Sched. 1; Sch. 1A Horseshoe Section Tunnel, Sch. 1-B, circular section tunnel, $2,407,300. Plans deposit $25. CD 11/15/60.

▲ **Oregon**—BA 1/16—Portland General Electric Co., 621 SW Alder St., Portland, ROCK FILL DAM, 440 ft. high, INTAKE STRUCTURE, SPILLWAY TUNNEL, other STRUCTURES, Round Butte Dam, Proj. RB 13. Plans deposit $50. John Bankus, c/o owner, engr. CD 12/5/58.

BUILDINGS—BA

▲ **Wash., Shelton**—BA 12/14—State Dpt. General Admin. General Admin. Bldg., Olympia, mechanical, electrical and equipment contracts for first phase CORRECTION CENTER, near here. $2,550,000. CD 4/8/60.

▲ **Wash., Shelton**—BA 12/21—State Dpt. General Admin. General Admin. Bldg., Olympia, general contract CORRECTION CENTER, near here. $3,500,000. Plans deposit $150. CD 4/8/60.

BUILDINGS—SLC

▲ **Calif., San Diego**—Westgate California Corp., c/o C. Arnholt Smith, U. S. National Bank, 202 Broadway, Zone 1, soon lets contract 25 story, 438,000 sq. ft. U. S. National BANK and OFFICE, 2nd and Broadway. $10,000,000. Raymond Harry Erwin & Assoc., 1500 Denver Club Bldg., Denver, Colo., archts. CD 10/10/61.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento. Bids opened 11/15. ROADS.

Calif.—**Gordon H. Ball, Gordon H. Ball, Inc.,** 300 Camille Ave., Danville, Calif., LB **$5,315,555,** (6 bidders), grading, paving to convert 5.1 mi. US Hy. 40 Expressway to six lane freeway between 1.9 mi. southwest of Vacaville and 1.2 mi. northeast of Hy. Rte. 90, Solano Co.;

Calif.—**Harms Bros. and Lord & Bishop, Inc.,** 5262 Stockton Blvd., Sacramento, Calif., LB **$3,741,510,** (5 bidders), 6.8 mi. four lane freeway on US Hy. 40 Alt. between 0.4 mi. south of Groville and 0.6 mi. north of Wicks Corner, Butte Co. CD 10/12/61.

▲ **Fruin-Colnon Contracting Co.** and **Alex Robertson,** 48 Park Rd., Burlingame, Calif., LB **$7,587,427,** (9 bidders), WATER FILTRATION PLANT, American River near Sacramento State College, SACRAMENTO, CALIF. City Council, City Hall, 9 and I Sts., Sacramento, Calif. BA 11/16. CD 10/12/61.

BUILDINGS—LB & CA

▲ **Tallyho Inns of America, Inc.,** 200 5th Ave., New York 10, N. Y., Owner Builds, **$6,500,000,** 322 room TALLYHO RESORT HOTEL and 32 four room VILLAS, 32 swimming pools, golf course, 40 acres on Las Vegas Strip; **$3,000,000,** 150,000 sq. ft. International Promenade Plaza SHOPPING CENTER, Las Vegas Strip, LAS VEGAS, NEV. Rissman & Rissman, 1011 Swathmore Ave., Pacific Palisades, Calif., archts., for hotel Chas. Luckman Assocs., 9220 Sunset Blvd., Los Angeles, Calif., archt. for shopping center.

▲ **Utah Constr. & Mining Co.,** 550 California St., San Francisco, Calif., CA **$3,438,222,** 9 floor rein.-con. BARROWS HALL, BERKELEY, CALIF. Regents of University of California, c/o Architects & Engineers, University of Calif., Berkeley, Calif. BA 10/31. CD 11/14/61, under LB.

CANADA

BUILDINGS—BA

▲ **Ont., Toronto**—BA 12/4—Bd. Educ., 155 College St., 3 story, brick, block, structural steel frame, Western Commercial SCOOL ADDN., CLASSROOM WING ALTERATIONS, 12 Evelyn Crescent. $2,566,000. Plans deposit $50. Pentland & Baker, 490 Jarvis St., archts. Reicher, Bradstock & Assocs., Ltd., 600 Eglinton Ave. E., engrs. CD 6/12/61.

▲ **Ont., Bell's Corners**—BA 12/12—Nepean Dist. High School Bd., structural steel, brick, rein.-con. HIGH SCHOOL, incl. two 2 story wings, one 1 story wing, $2,350,220. Burgess, McLean & MacPhayden, 226 MacLaren St., Ottawa, archts. CD 8/4/61.

BUILDINGS—LB & CA

▲ **V. V. DeMarco Properties Ltd.,** 1415 Lawrence Ave. W., Toronto, Ont., CA Est. **$4,000,000,** 418 HOUSES, AJAX, ONT. Duffins Creek Estates Ltd., c/o Venchiarutti & Venchiarutti, archts., 194 Wilson Ave., Toronto, Ont.

U.S. POSSESSIONS

BUILDINGS—LB & CA

▲+ **H. A. Lott, Inc.,** Box 25005, Houston, Tex., and **Johnson, Drake & Piper, Inc.,** Box 20036, Houston, Tex., LB **$2,225,000,** (8 bidders), REPLACEMENT U. S. COMMUNITY HOUSING, Pacific Side Canal Zone, Proj. PC-62-11, BALBOA HEIGHTS, PANAMA. Panama Canal Co., 21 West St., New York 6, N. Y. BA 11/1. CD 10/11/61.

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲ **Honduras**—Director General Hys., Office Ministry of Communications & P. Wks., Tegucigalpa, ROAD.

Morrison-Knudsen Co. Inc., 319 Broadway, Boise, Idaho, U.S.A., CA **$3,957,097,** 55.294 kms. Section 3, Santa Rosa de Copan to La Labor, Western Hy. Extension. BA 9/12. CD 11/15/61, under CA.

FOREIGN

HEAVY CONSTRUCTION—LB & CA

▲ **Solel Boneh Overseas & Harbours Ltd.,** Haifa, Israel, CA Est. **$3,000,000,** TERMINAL BLDGS. at Addis Ababa, Asmara, Jimma and Dira Dawa Airports, ETHIOPIA. Minister of P. Wks. & Communications, Imperial Govt., Ethiopia and Ethiopian Airlines, Addis Ababa, Ethiopia. BA 9/25. CD 8/14/61.

For additional reports see CONSTRUCTION DAILY REPORTS SECTION

PROPOSED PROJECTS

WATER SUPPLY

▲ **Calif., San Francisco**—City and San Francisco Co., City Hall, voted **$115,000,000** bonds Nov. 7, WATER DEVELOPMENT, incl. storage at Hetch Hetchy DAMS, tunnels, pipe lines for City and Peninsula and South Bay Areas. CD 9/27/61.

▲ **O., Oregon**—City, City Hall, defeated **$3,500,000** bonds Nov. 7, WATERWORKS. CD 7/20/61.

▲ **Va., Portsmouth**—City, City Hall, voted $5,600,000 bonds Nov. 7, 31 mi. WATER TRANSMISSION MAINS, Suffolk to Portsmouth, **$3,000,000;** ELEVATED WATER STORAGE RESERVOIR, **$500,000;** WATER PUMPING STATIONS, **$300,000;** WATER FILTRATION PLANT, **$1,000,000;** GROUND WATER STORAGE RESERVOIR, **$200,000.** CD 10/26/61.

SEWERS, WASTE DISPOSAL

▲ **N. C., Wilmington**—City, City Hall, voted bonds Nov. 7, SEWERAGE EXTENSION annexed area, **$2,500,000.** (Correction—owner). CD 11/13/61.

STREETS AND ROADS

▲ **O., Cincinnati**—City, City Hall, defeated $7,000,000 bonds Nov. 7, STREET IMPRVS. CD 8/16/61.

(Continued on page 60)

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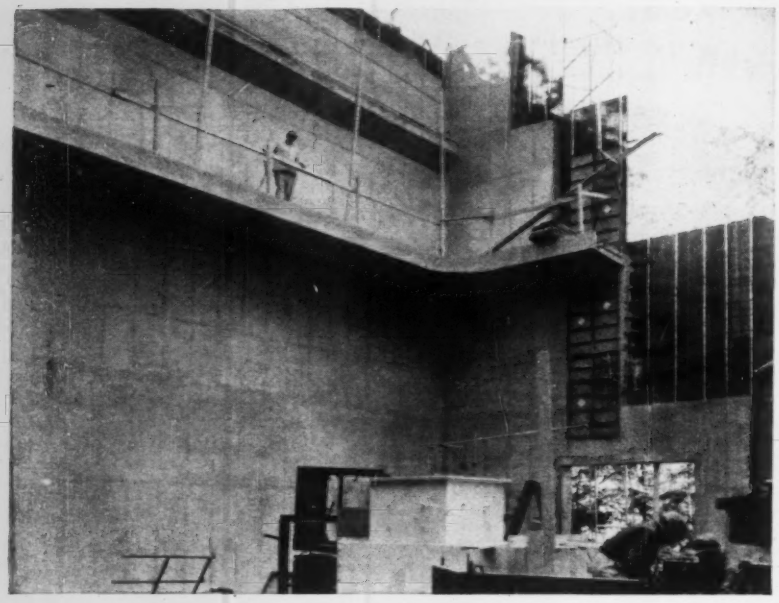

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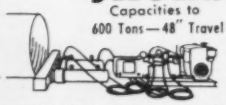

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(Continued from page 58)

▲ O., Kettering—City, City Hall, defeated $4,000,000 bonds Nov. 7, HIGHWAYS. CD 6/2/61.

▲ WASHINGTON—State Hy. Comn., Transportation Bldg., Olympia, ROAD, Lewis Co.—relocating 18 mi. Primary State Hy. No. 5, Mossyrock to Kosmoas. $6,800,000. (Correction—county). CD 11/6/61.

EARTHWORK, WATERWAYS

▲ California—Turlock and Modesto Irrigation District, 117 W. Main St., Turlock, voted $5,250,000 bonds Nov. 7, Don Pedro DAM, Tuolumne River, Tuolumne Co. $75,000,000. Cost will be shared by San Francisco. CD 5/25/61.

AIRPORTS

▲† Fla., Mayport—Southeast Division, Bureau Yards & Docks, U. S. Naval Base, Charleston, S. C., plans by Joseph Bryson, 301-303 Greenleaf Annex, Jacksonville, 140 units FAMILY HOUSING, $2,500,000. CD 9/1/61.

▲ Fla., Miami—Bd. Comrs. Dade Co. and Dade Port Auth., Courthouse, 300,000 sq. ft. OVERHAUL and MAINTENANCE SHOPS, Miami International Airport, $5,000,000. L. B. Taylor, Dupont Bldg., consult. engr. Pan American World Airways, 1820 Delaware Parkway, lessee. CD 10/12/61.

▲ Mo., St. Louis—City, City Hall, $2,000,000 bond election Jan. 23, City-County AIRPORT, for city's share of cost. Over $4,000,000. CD 4/29/59.

UNCLASSIFIED

▲ Mo., St. Louis—City, City Hall, $6,000,000 bond election Jan. 23, SPORTS STADIUM. CD 8/16/44.

▲ Mo., St. Louis—City, City Hall, $3,000,000 bond election Jan. 23, PARKS and PLAYGROUNDS incl. PLAZA, $2,000,000; PARK, $800,000; TOWER GROVE PARK IMPRVS., $200,000. CD 8/16/44.

▲ Mo., St. Louis—City, City Hall, $4,000,000 bond election Jan. 23, STREET LIGHTING, incl. residential streets, $2,400,000, and commercial areas and main arteries, $1,600,000. CD 5/31/55.

▲ Oklahoma and Texas—Cherokee Pipe Line Co., (Continental Oil Co. and Cities Service Pipe Line Co.), Ponca City, Okla., 127 mi. 8 in. PETROLEUM PRODUCTS LINE, Oklahoma City, Okla. to Wichita Falls, Tex. $2,600,000.

▲ Alberta—City, City Hall, Edmonton, 30 mi. TRANSMISSION LINE, SUBSTATIONS to carry power from projected plant Genesee Area to Edmonton. $2,500,000. C. Z. Monaghan, c/o owner, engr.

PUBLIC BUILDINGS

▲ Calif., Fremont—Irvington Elementary School Dist., 40775 Fremont Blvd., $3,000,000 bond election Jan. 19 and $12,000,000 State Loan for SCHOOLS.

▲ Calif., Redwood City—San Mateo County, Hall of Justice, plans by Alfred Johnson, 3311 B St., 4 story, Type I, constr. HALL OF JUSTICE EXPANSION, $2,500,000. Cecil H. Wells, Jr., 330 W. 20th Ave., San Mateo, consult. engr. CD 2/14/61.

▲ Calif., Santa Ana—Santa Ana School Dist., 1405 French St., voted $14,500,000 bonds Oct. 31, SCHOOLS. CD 9/11/61.

▲† Ga., Lawrenceville—General Services Admin., 50 7th St., NW, Atlanta, plans by Heery & Heery, 1366 Peachtree St., NE, Atlanta, ANIMAL BREEDING and HOLDING FACILITY. $2,500,000. J. W. Austin, Jr. & Assocs., 1477 Peachtree St., NE, Atlanta, and Leroy Edwards, 165 Alexander St., NW, Atlanta, mech. engrs. CD 6/2/61.

▲ Mich., Temperance—Bd. Educ. Bedford Twp. School Dist., Temperance, $3,000,000 bond election Dec. 18, HIGH SCHOOL, along Douglas Rd. between Emperance and Lambertville; GRADE SCHOOL ADDN., Jackman and Dean Rds. CD 9/19/61.

▲ Mich., Walled Lake—Walled Lake School Dist., $2,100,000 bond election Jan. 22, ELEMENTARY SCHOOLS and ADMINISTRATION BLDG. and $400,000 bond issue for AUDITORIUM, adjacent to High School. $2,500,000. CD 2/27/58.

▲ Minn., St. Paul—Bd. Educ. Special School Dist. No. 2 plans by Hammel & Green, Inc., 2650 University Ave., St. Paul, Minn., Highland Park HIGH SCHOOL, Edgecombe Rd. and Snelling Ave., $2,600,000. Bids 1962, CD 11/3/60; plans by Bettenburg, Townsend, Stolte & Comb, 1437 Marshall Ave., St. Paul, Minn., Cleveland HIGH SCHOOL ADDN., 747 Jenks Ave., $550,000. Bids 1962. CD 11/9/59.

▲ N. J., New Brunswick—Bd. Educ. City New Brunswick, 24 Bayard St., voted referendum and project Nov. 7, SENIOR HIGH SCHOOL, $3,000,000. Merchant Seidel & Hickey, 1 Elm Row, archts. CD 10/2/61.

▲ N. J., Rahway—Bd. Educ. City Rahway, High School, 1012 Madison Ave., $3,905,000 referendum bonds and project Dec. 12, HIGH SCHOOL ADDN., Madison Ave.; JUNIOR HIGH SCHOOL, Kline Place. Leslie Dennis, 134 Elmora Ave., Elizabeth, archt. CD 11/9/61.

▲ N. J., Trenton—Bd. Educ. Ewing Twp., Parkway Ave., $3,303,000 bond election Dec. 12, ELEMENTARY SCHOOL, Bear Tavern Rd.; Ewing HIGH SCHOOL ADDN.; Antheil JUNIOR HIGH SCHOOL ADDN., Fisher JUNIOR HIGH SCHOOL ADDN.; CENTRALIZED ADMINISTRATION BLDG. $3,600,000. Bids in March. CD 8/14/61.

▲ N. C., Greensboro—Greensboro Housing Auth., 743 Florida St., plans by Charles C. Hartmann, 405 W. Fisher Ave., 450 unit low rent HOUSING. $4,500,000. BA summer 1962.

▲ N. C., Wilmington—Bd. Comrs. New Hanover Co., Courthouse, voted $5,500,000 bonds Nov. 7, HOSPITAL. CD 8/30/61.

(Continued on page 62)

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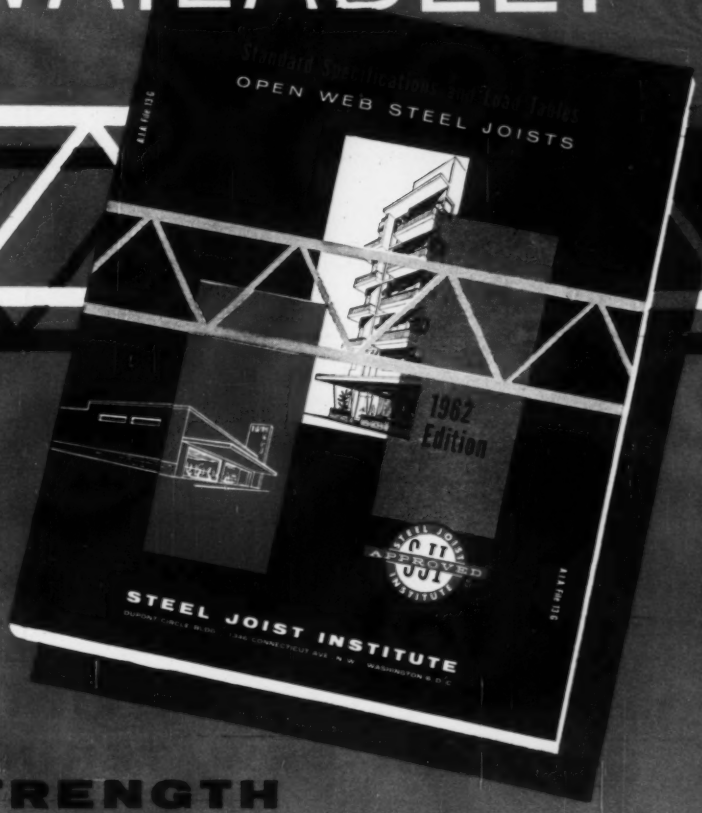

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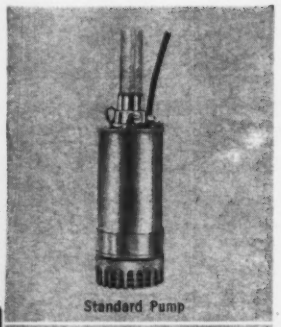

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(Continued from page 60)

▲ **O., Toledo**—Washington Twp. Bd. Educ., 5700 Whitmer Dr., defeated **$5,245,000** bonds Nov. 7, two JUNIOR HIGH SCHOOLS, two GRADE SCHOOLS, BLDGS. ADDNS. CD 7/20/61.

▲ **Pa., Ardmore**—Lower Merion Twp. School Bd., voted **$3,800,000** bonds Nov. 7, SCHOOL CONSTR. CD 10/17/61.

▲ **Va., Danville**—City, City Hall, voted $3,500,000 bonds Nov. 7, HIGH SCHOOL, **$1,000,000**; ELEMENTARY SCHOOL "A", **$500,000**; ELEMENTARY SCHOOL "B", **$500,000**; ELEMENTARY SCHOOL "C", **$500,000**.

▲ **Alberta**—City, City Hall, Edmonton, 150,000 kw. POWER PLANT, Genesee Area. **$17,000,000**. Constr. 1965. C. Z. Monaghan, c/o owner, engr.

▲ **Alta., Jasper Place**—Dpt. P. Wks., Parliament Bldgs., Edmonton, plans by Diamond, Clarke & Assocs., 11536 Jasper St., Edmonton, 50 bed HOSPITAL, ACTIVE TREATMENT HOSTEL, NURSING SCHOOL, **$13,000,000**. Misericordia Hospital, 111 St. and 98th Ave., Edmonton, lessee. (CORRECTION-owner). CD 10/18/61, under Commercial Buildings.

▲ **Ont., Toronto**—Toronto Transit Comn., 1900 Yonge St., UNDERGROUND WORKSHOPS, OFFICE, Greenwood Ave. for Rapid Transit Subway. **$13,000,000**. CD 1/11/55, under Unclassified.

COMMERCIAL BUILDINGS

▲ **Calif., Carmel**—Paul Jones, P.O. Box 1389, Monterey, Rancho Fiesta CONVALESCENT HOME, Carmel Valley, near here. Over **$3,000,000**.

▲ **Calif., Oakland**—Gerdon Land Co., 805 Clay St., plans by Hammarberg & Herman, 307 El Cerrito Plaza, El Cerrito, Z-shaped SHOPPING CENTER, Broadway and McAdam Sts. **$3,500,000**. Albert-Lovett Corp., 305 El Cerrito Plaza, El Cerrito, developer-lessee.

▲ **Calif., Pacifica**—Henry Doelger Builders, Inc., 333 Park Plaza Dr., Daly City, 1,700 HOUSES, APARTMENTS, three SCHOOLS, SHOPPING CENTER, Fairmount. **$40,000,000**. To go ahead in Spring.

▲ **Calif., Palo Alto**—Stanford University, Office Business Mgr., Encina Hall, plans by Gardner A. Dailey, 442 Post St., San Francisco, Calif., 3 story, 80,000 sq. ft. concrete, aggregate panels, tile roof ENGINEERING BLDG., on Stanford University Campus. **$2,500,000**.

▲ **Calif., San Francisco**—Peninsula Apartments, Inc. (Irving J. Kahn and Norman Smith, San Diego; Milton Gordon, Los Angeles; Sam Minskopf & Sons, New York), c/o B. Clyde Cohen, archt., 444 Market St., San Francisco, and James K. Levorsen, archts., 535 Pacific Ave., San Francisco, Calif., 999 unit APARTMENT, Red Rock Hill, Diamond Heights Redevelopment Area (22 acre site). **$20,000,000**.

▲ **Calif., Santa Barbara**—Y.M.C.A., Santa Barbara, four 3 story and four 1 story APARTMENTS, Hitchcock Way and Santa Maria Lane. **$2,500,000**.

▲ **Calif., Sausalito**—Albert Lovett Corp., 305 El Cerrito Plaza, El Cerrito, and T. J. Bettes Co., 315 Montgomery St., San Francisco, plans by Hurt & Trudell, 709 Mission St., San Francisco, 60-unit Cote d'Azur COOPERATIVE APARTMENTS, swimming pool, parking stalls, boat deck. **$2,600,000**.

▲ **Calif., Walnut Creek**—John Muir Hospital, c/o Chm. Bd. Trustees, 1361 Locust St., 150-bed John Muir HOSPITAL, Ygnacio Valley Blvd. **$4,000,000**.

▲ **Fla., Lake Wales**—National Letter Carriers Assn., 100 Indiana Ave., N.W., Wash., D. C., plans by Dano Jackley, 130 W. Hamilton St., Baltimore, Md. RETIREMENT HOUSING DEVELOPMENT, **$4,500,000**. Whitman-Requardt & Assocs., 1304 St. Paul St., Baltimore, Md., mech. engrs. CD 6/21/61.

▲ **Fla., Miami**—Kings Point Development Co., 10245 Collins Ave., Bal Harbour, Miami Beach, plans by Gilbert Fein & Assocs., 1674 Meridian Ave., Miami Beach, 500 APARTMENT UNITS. **$7,000,000**.

▲ **Ill., Chicago**—Butler Paper Corp., 223 W. Monroe St., Zone 6, plans by Alfred Shaw, 208 S. LaSalle St., Zone 4, 20 story OFFICE, Monroe and Franklin Sts. **$10,000,000**. BA 1965.

▲ **Ind., Indianapolis**—Riley Center Corp., c/o Klein & Kuhn Real Estate, 620 Guaranty Bldg., plans by Perkins & Will, archts.-engrs., 309 W. Jackson St., Chicago, Ill., four 24 story APARTMENTS, eight 12 story APARTMENTS, ten TOWN HOUSES, RESTAURANT, THEATER, POOL, Cleveland, Hudson, Michigan and Fort Wayne Sts. Total Est. **$40,000,000**. BA 1/62.

▲ **Mo., St. Louis**—Mansion House Center Redevelopment Corp., 812 Olive St., plans by Schwarz & Van Hoefen, 1620 Chemical Bldg., three 28 story, 1,700 units APARTMENTS, 8 to 10 story OFFICE, 16 story MOTEL, between 3rd and 4th Sts. Chestnut St. and Washington Ave. **$40,000,000**. CD 9/21/59, under Lewis Kitchen and Paul Lashly, as owners.

▲ **N. J., Camden**—First Methodist Church, 6th and Stevens Sts., CHURCH and HOUSING PROJECT for ELDERLY. **$2,500,000**.

▲ **N. J., Middletown**—John Elyar, Box 4276, plans by Peter Grygotis, 306 Aldene Rd., Roselle, 630 unit garden APARTMENT, Mountain Hill Rd. **$2,500,000**. Henry F. Labrecque, 17 Linden Pl., Red Bank, consult. engr.

▲ **N. Y., Forest Hills**—Lane Realty Corp., 107-40 Queens Blvd., plans by Milton F. Kirchman, 230 W. 13 St., New York, Zone 4, 18 story Lane Towers OFFICE and APARTMENT, southeast corner Queens Blvd. and 70 Rd. **$2,500,000**. Atlas & Rosenberg, 303 W. 42 St., New York, Zone 36, struct. engrs. Constr. Spring 1962. CD 8/28/59.

▲ **N. Y., Mineola**—Nassau Hospital, 2nd St., plans by Ferrez & Taylor, 1451 Broadway, New York, Zone 36, 6 story HOSPITAL ADDN., 1 story AUDITORIUM,

(Continued on page 64)

Cable's best friend

General Electric silicone rubber insulation protects against heat, overloads, ozone, aging, moisture and radiation

Double Capacity, Overload Protection — When used to insulate cable, silicone rubber gives you up to *twice* the current capacity, *twice* the overload protection as ordinary insulation. The superior electrical properties and wide operating temperature range of silicone rubber are the reasons.

Greater Reliability, Longer Life — G-E silicone rubber insulation has long service life at temperatures from −55°C to 200°C, and it is virtually ageless under severe conditions of heat, ozone, sub-freezing, moisture, and radiation. Trust it to keep working long after ordinary insulation fails.

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Get the full story on cable's best friend: silicone rubber. Write: General Electric Company, Silicone Products Dept., Section YY1160, Waterford, New York.

GENERAL ELECTRIC

THE SURVEYOR'S NOTEBOOK

Optical Plummet Transit Replaces Theodolites on Tough Jobs at Plattsburgh Missile Base

"As you may have guessed, we've had some really rugged and unusual problems building the Plattsburgh (N.Y.) Missile Base," says Leigh French, Chief Field Engineer for Raymond-Kaiser-Macco-Puget Sound (A Joint Venture), contractors on the job. "No matter what unique surveying problem is involved, we have the added headache of exceptionally close tolerances—often to 1/16 or 1/32 of an inch. Needless to say, that is unusually accurate for construction work.

Leigh French (l.), Adolph Vaal on instrument platform with their Optical Plummet Transit.

"In building 200-foot underground 'silos', which house Atlas F guidance systems, we first tried imported theodolites but found we couldn't get the length of focus that was required. Adolph Vaal, my instrument man on sight tube setting, was acquainted with the Gurley Optical Plummet Transit and suggested we try it. Now the theodolites are gathering dust back in the office.

"In using the Gurley 'OP' in this work, we often have to set up on platforms over points which are 10 to 20 feet below the instrument on the center line of the sight tube. The Gurley Shifting-Head Tripod helps us to get into alignment fast. These sight tubes must be carefully set to an angle of 49°30', so accurate vertical angles are required. The level on the telescope makes it possible to adjust and check the vertical circle verniers quickly and easily by merely leveling the telescope.

"With all the wild winds up here, we're particularly happy not to have to worry about a flapping plumb bob. Adolph Vaal tells me he feels 'safer' using the 'OP' than any other instrument he's tried; says it's 'more rugged... doesn't get out of adjustment... everything can be seen instantly.' One time a 70-mile-an-hour gale knocked the Gurley down and it was still in perfect adjustment. And even in 45-below-zero cold, a complete check and adjustment can be made in the field in under five minutes.

"At the moment we're working in quicksand; but we know we can count on the Gurley 'OP' to pull us out."

You, too, can count on the Gurley Optical Plummet Transit to pull you out when you have tough assignments. **Available in 21 combinations. Write for further information.**

Setting the steel in the "silo" cap.

W. & L. E. GURLEY

Union Plaza, Troy, N. Y.

GURLEY Surveying and Scientific Instruments

(Continued from page 62)

ALTERATIONS TO EXISTING BLDG. $3,900,000. Jaros Baum & Bolles, 415 Lexington Ave., New York 17, N. Y., mech. engrs. Severud-Elstad-Krueger Assocs., 415 Lexington Ave., New York 17, N. Y., struct. engrs. CD 10/16/61.

▲ **N. Y., New York**—Columbia Broadcasting System, Inc., 485 Madison Ave., plans by Charles Luckman, 680 5 Ave., Zone 19, TV Network PRODUCTION CENTER ADDN., W. 57, 10 and 11 Aves. $14,500,000. Seelye, Stevenson, Value & Knecht, 101 Park Ave., Zone 17, consult. engrs. Bids Spring 1962. CD 1/30/61.

▲ **N. Y., New York**—Columbia University, 116 St. and Broadway, sketches by Sherwood, Mills & Smith, 65 Broad St., Stamford, Conn. and Eggers & Higgins, 100 E. 42 St., Zone 17, 3 story GYMNASIUM and RECREATION CENTER with swimming pool, Morningside Ave. $8,000,000. Weiskopf & Pickworth, 230 Park Ave., Zone 17, struct. engrs. Syska & Heinessey, Inc., 144 E. 39 St., Zone 16, mech. engrs. CD 9/27/60.

▲ **N. Y., New York**—Harlem Savings Bank c/o Fred French Investing Co., 551 5 Ave., plans by William Lescaze, 211 E. 48 St., Zone 17, 17 story OFFICE and STORES, 300 E. 42 St. and 770 2 Ave. $3,000,000. Rutherford Stinard, 149 E. 45 St., Zone 17, mech. engr. Jas. Ruderman Assocs., 32 Union Sq., Zone 3, struct. engrs.

▲ **N. Y., North White Plains (Sta. White Plains)**—Millard & William Shroder Co., Inc., 441 Lexington Ave., New York 17, N. Y., plans by Schuman & Lichtenstein, 360 Lexington Ave., New York 17, N. Y., one 15 story RESIDENTIAL HOTEL and one 6 story TRANSIENT HOTEL, North Broadway between Holland Ave. and Glen St. $3,500,000. Constr. Spring 1962.

▲ **Va., Hampton**—Mars, Inc., c/o Martel Epstein, 3820 Chesapeake Ave., Newport News, 225 HOUSES, PLAYGROUND, SWIMMING POOL, Rte. 17. $3,000,000.

▲ **Va., Richmond**—St. Marys Catholic Hospital, c/o The Most Rev. John Russell, Bishop of Richmond, 800 Cathedral Place, plans by Ballou & Justice, 530 East Main St., 7 story, approx. 170,000 sq. ft., 154-bed, conc. masonry General HOSPITAL. $5,000,000. Torrence & Dreelin, 304 West Cary St., consult. engrs.

▲ **Wash., Yakima**—St. Elizabeth Hospital, 110 S. 9th Ave., plans by T. F. Hargis Jr., Miller Bldg., HOSPITAL ADDN. $2,500,000. CD 8/28/61.

▲ **Wis., Milwaukee**—H-L Corp., c/o Phil Akwa, 1212 West Wisconsin Ave., plans by Hausner & Macsai, 104 South Michigan Ave., Chicago, Ill., 23 story, 253 unit APARTMENT. $5,000,000.

▲ **Ont., Toronto**—Parkway-Pass Developments Ltd., 91 Aldershot Crescent, Willowdale, plans by Ray Moriyama & Assocs., 711 Church St., 300 unit MOTEL, Hy. 401 between Woodbine and Victoria Park. $3,000,000.

INDUSTRIAL BUILDINGS

▲ **Ga., Atlanta**—Republic-Transcon Industries, Inc., 9570 Wilshire Blvd., Los Angeles, Calif., PLANT to mfg. gas and electric water heaters, air conditioning equipment and outdoor signs. $2,500,000.

▲ **La., Baton Rouge**—Allied Chemical Corp., 61 Broadway, New York 6, N. Y., and Union Texas Natural Gas Corp., 811 Rusk St., Houston, Tex., PETROCHEMICAL COMPLEX, south of here. $40,000,000-$50,000,000.

▲ **Mich., Battle Creek**—Kellogg Co., 235 Porter St., 257,000 sq. ft. PLANT ADDN. and OFFICE. $4,000,000.

▲ **Tex., Galena Park**—Anchor-Hocking Glass Corp., 70 Glass Ave., Lancaster, O., Phase 1, GLASS CONTAINER MFG. PLANT, $4,000,000, Bids March 1962; Phase 2, WAREHOUSING, $250,000, Bids February 1962; Phase 3, SITE DEVELOPMENT, grading, filling, leveling, water, $80,000. Bids 1962.

▲ **Tex., Midland**—El Paso Natural Gas Co., P. O. Box 1492, El Paso, GAS PLANT AND LINES, FOR 1962, $2,500,000.

▲ **Alta., Camrose**—Page-Hershey Tubes Ltd., 100 Church St., Toronto, Ont., STEEL PIPE MFG. PLANT to produce 4-to 16-in. outside diam. pipes with lectric resistant weld, $7,000,000. BA soon.

▲ **Ont., Toronto**—John Labatt Ltd., Simcoe St., London, plans by Gordon S. Adamson & Assocs., 52 St. Clair Ave. E., 1 story, BREWERY, Hy. 401 and Islington Ave. $8,000,000. M. M. Dillon & Co., Ltd., 88 Eglinton Ave. E., consult. engrs. CD 8/29/61.

▲ **Ont., Toronto**—Pigott Constr. Co., Ltd., 1250 Bay St., plans by James A. Murray, 440 Bayview Ave., CROSSROADS, twenty PLANTS, Hys. 5 and 27, Etobicoke Twp. $15,000,000. Proctor & Redfern, 75 Eglinton Ave. E., consult. engrs.

LATIN AMERICA

▲ **Colombia, Bogota**—San Jose Hospital, Bogota, plans by Cuellar-Serrano-Gomez, Edificio Seguros Bolivar, Bogota, Colombia, HOSPITAL. $3,250,000.

▲ **Paraguay, Asuncion**—Industria Paraguaya de Carnes, S.A. Casilla de Coreas 115, SLAUGHTERHOUSE. $4,000,000.

FOREIGN

▲ **Philippine Islands**—National Power Corp. of Philippines, 161 Bonifacio Dr., Manila, 410x1,700 ft. earth and rock fill HYDROELECTRIC DAM, 4,600 ft. PRESSURE TUNNEL, POWERHOUSE to incl. four 50,000 kw. GENERATORS, Angat River, 25 mi. northeast of Manila, Island of Luzon. $62,800,000.

For additional reports see CONSTRUCTION DAILY NEWSLETTER

When Georgia was still a British Crown Colony in 1775, an act was passed that authorized a tax on all male inhabitants within the "road age," sixteen to sixty. This was the first official act put into effect in the South pertaining to overland transportation. Not long after that, all males within the "road age" in the state were called upon to work on their local roads from five to fifteen days per year. Today, over 200 years later, the work is still in progress on Georgia's highways, but now, instead of Colonial settlers, huge earthmoving machines and skilled engineers are building hundreds of miles of brand-new highways. The "Interstate Age" has replaced the "road age" in Georgia. For a report on Georgia's Interstate Highway Program, turn the page.

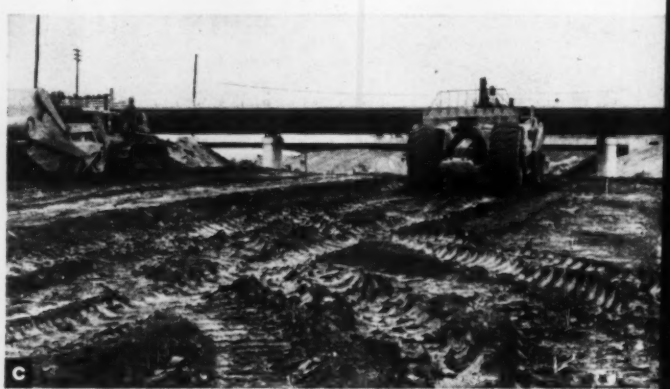
Georgia's highway program has a steel foundation

In Georgia, 1,107 miles of Interstate roads have been authorized by the Bureau of Public Roads. Completed to date: 122 miles with 208 miles now under construction. 1,200 bridges will be needed to complete the system, with 290 already done. Responsible for this gigantic project are Jim L. Gillis, Sr., chairman, Georgia State Highway Board, and M. L. Shadburn, chief highway engineer. When Georgia's highway construction is completed, every foot of the roadway will be stronger and last longer because of the part played by U. S. Steel products in their construction. When the first ground is broken, power equipment built with USS High Strength Steels will take big bites out of the countryside. Contractors will move more earth per dollar because these strong steels last longer, weigh less and are stronger for greater efficiency and economy. Trucks, bulldozers, tractors, shovels—all the heavy equipment needed to build a modern highway—operate better because of these modern steels.

The long ribbons of concrete and the bridges that span Georgia's many rivers and streams along the Interstate routes are given extra durability by USS Highway Products. USS AMERICAN Welded Wire Fabric and USS DI-LOK Reinforcing Bars add stamina to the roadway. Paving is done smoothly with USS UNIVERSAL and ATLAS Cement products. Thousands of tons of USS Structural Carbon Steel and USS Steel H-Piles give bridges needed strength and permanent support. Galvanized corrugated steel culverts provide economical and dependable drainage. Strong, long-lasting USS CYCLONE Fencing, USS Highway Beam Guardrail and big, easy-to-read steel signs are all-important safety factors along Georgia's new highway system.

Here are a number of USS Highway Products in action: **a.** USS H-Piles will support this bridge. Their advantages include high load-carrying capacity and the ability to penetrate to firm strata where other pile types would be damaged or destroyed in driving. **b.** USS DI-LOK Reinforcing Bars strengthen the flooring and piers of this bridge. DI-LOK Bars are specially

a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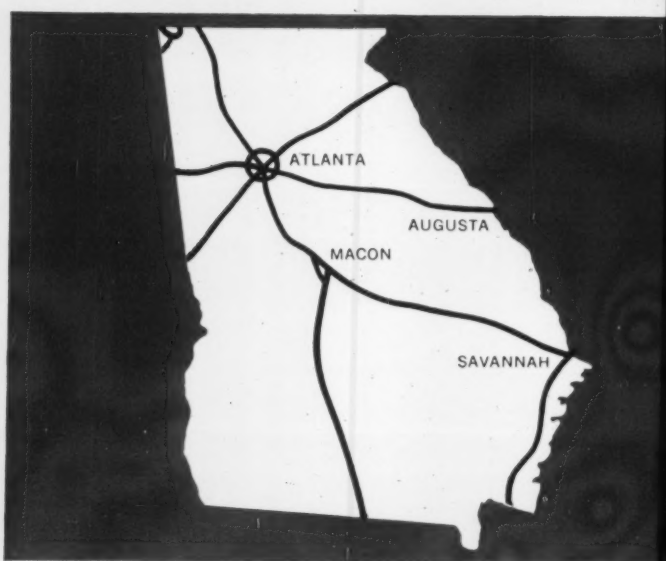

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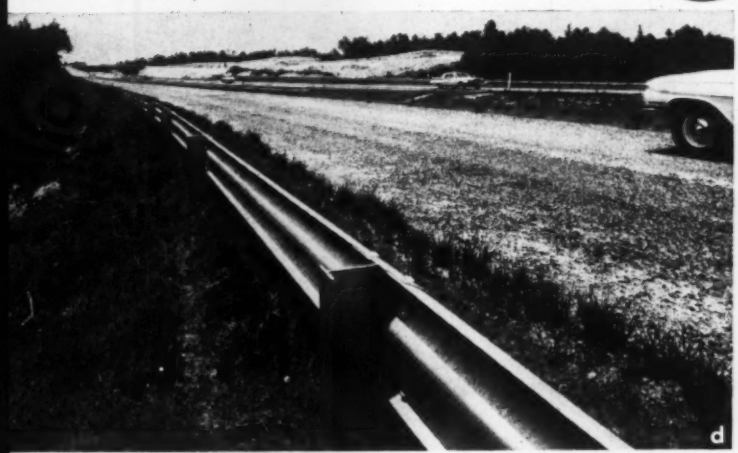
designed with a continuous diamond-locking conformation to insure positive anchorage, inhibit longitudinal movement of bars, and strengthen the bond between concrete and bridge. **c.** Earthmoving equipment must operate at full capacity and at high speeds to pay its way. U. S. Steel has developed a number of special steels for construction equipment that reduce over-all weight and provide excellent resistance to abrasion and shock. In trucks, graders, bulldozers—all the giant machines that build our roads today—USS "T-1" Constructional Alloy Steel, USS TRI-TEN, MAN-TEN and COR-TEN High Strength Steels improve performance and reduce expensive downtime. USS TIGER BRAND Wire Rope is strong and long-lasting, and enables buckets and cranes to operate for long periods without costly replacement. **d.** Interstate Highways are safer ways with strong USS Highway Guardrail. It is built extra-strong to withstand terrific impacts, and requires minimum maintenance. Steel's great strength and ease of installation make it an ideal highway investment. **e.** USS Galvanized Culvert Sheets, for instance, are ideal for installations carrying heavy loads over shallow fill because they are flexible, deflect under loads and gain support from the fill around them. Steel drainage products are more economical because they are delivered to the job ready for quick installation and service. They last for years because they are heavily zinc-coated for extra corrosion resistance. **f.** Easy-to-read signs are a must on high-speed Interstate roads. U. S. Steel provides many of the products for long-lasting, low-maintenance signs and markers. USS VITRENAMEL Sheets for porcelain-enameled signs provide maximum visibility and strength but require little or no maintenance. A passing shower washes them clean. Where *maximum* strength, economy and long life are important, steel fills the bill. USS Blast Furnace Slag makes an ideal roadbed foundation. It is economical, packs quickly and permanently, and provides an excellent bond for concrete. It has high resistance to weather action. USS Blast Furnace Slag weighs less than other types of aggregate and will yield a greater yardage of pavement for a given unit of weight. USS, AMERICAN, CYCLONE, DI-LOK, UNIVERSAL, ATLAS, TIGER BRAND, COR-TEN, TRI-TEN, MAN-TEN, VITRENAMEL and "T-1" are registered trademarks.

USS **United States Steel**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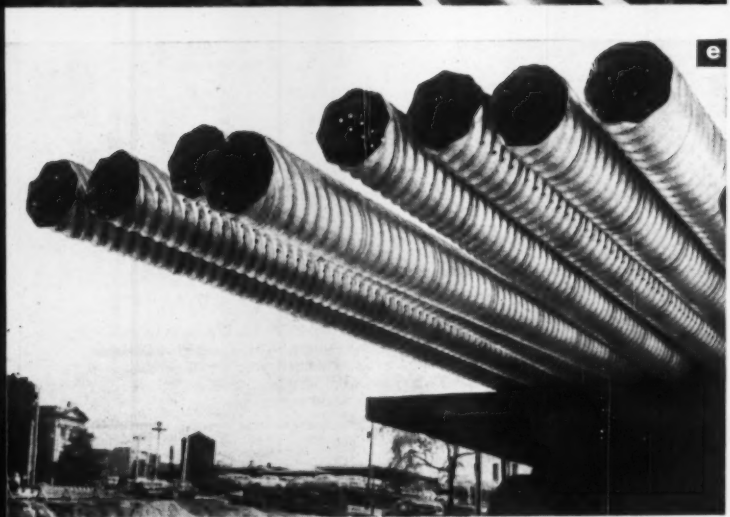
e

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United States Steel Corporation
Room 6406, 525 William Penn Place
Pittsburgh 30, Pennsylvania

1. Please send me your booklet, "Keep Our Roads on the Go."
2. I would also like to have more information on the products checked:

- ☐ Reinforcing bars
- ☐ Structural steel shapes
- ☐ Right-of-way fencing
- ☐ Signs and sign supports
- ☐ Lighting standards
- ☐ Bridge rail
- ☐ Guardrail
- ☐ High strength steels
- ☐ Constructional alloy steels
- ☐ Culvert sheets
- ☐ Steel H-piles
- ☐ Steel sheet piling
- ☐ Slag products
- ☐ Welded wire fabric (paving)
- ☐ Welded wire fabric (structural)
- ☐ Wire rope
- ☐ Cement products

Name_____

Company_____

Title_____

Address_____

City_____ Zone____ State_____

The highway market is also served by the following divisions of United States Steel: American Bridge Division • American Steel and Wire Division Columbia-Geneva Steel Division • Consolidated Western Steel Division National Tube Division • Tennessee Coal and Iron Division • Universal Atlas Cement Division • United States Steel Supply Division.

USS United States Steel

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BUILDINGS—SLC

▲ **Mass., Springfield**—Wolper Enterprises, Inc., c/o Max Gitberg, archt., 293 Bridge St., soon lets contract 13 story, 6 penthouses, Carleton Towers APARTMENT, State and Temple Sts. $2,500,000. CD 11/21/60.

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS** — Commonwealth Mass., Dpt. P. Wks., 100 Nashua St., Boston, Bids opened 11/21, ROAD,

George Brex, Inc., 1454 Methuen St., Dracut, Mass., LB **$1,068,090**, wid'n. section Rte. 128, U-272-(51), Woburn. CD 11/2/61.

▲ **RHODE ISLAND**—State R. I. & Prov. Plants, Div. Purchase, State House, Providence, ROAD,

Campanella & Cardi Constr. Co., 780 Jefferson Blvd., Wawrick, R. I., CA **$1,769,817**, paving, North Smithfield Expressway Louisquissett Pike to Massachussetts Line, Contr. NBR 6178 FA Proj. F-035(13), Bid No. 340, Contr. No. 6178, North Smithfield, BA 11/1/61. CD 11/3/61, under LB.

▲† **Gencarelli, Inc.**, 110 Oak St., Westerly, R. I., CA **$1,637,000**, REHABILITATION BREAKWATERS, Point Judith, ENG-19-91e-62-18, RHODE ISLAND. U. S. Eng., 424 Trapelo Rd., Waltham, Mass. BA 11/8/61. CD 10/27/61.

BUILDINGS—LB & CA

▲ **Gilbane Bldg. Co.**, 90 Calverly St., Providence, R. I., CA **$20,000,000**, 30 story OFFICE, BOSTON, MASS. Boston British Properties (Central & District Properties, Ltd., 12 Berkeley Sq., London W. 1 and E. Alec Colman Investments Ltd., 5 Hyde Park Gate, London S.W. 7, London, England). CD 11/21/61.

▲ **Vappi & Co., Inc.**, 240 Sidney St., Cambridge, Mass., CA Approx. **$2,400,000**, BLDGS. ADDNS., etc. for Laboratories studying MAGNETS and MAGNETIC ELECTRONICS, CAMBRIDGE, MASS. Massachusetts Institute Technology, 77 Mass. Ave., Cambridge, Mass. and National Magnet Laboratories. BA 10/10. CD 9/20/61.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ **NEW YORK**—BA 1/10—Triborough Bridge & Tunnel Auth., Administration Bldg., Randall's Island, New York, Zone 35, BRIDGE,

Narrows Bridge Contr. No. NB-12, Brooklyn APPROACH, Brooklyn-New York City. Plans deposit $130. CD 1/20/55.

BUILDINGS—BA

▲† **Mo., Fort Leonard Wood**—BA 12/19—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., three 2-Company, 40,600 sq. ft. each EM BARRACKS, 13,300 sq. ft. CONSOLIDATED MESS; 12,200 sq. ft. ADMINISTRATIVE and STORAGE BLDG., ENG-23-028-62-21. $3,000,000. Plans deposit $10. CD 11/13/61.

▲ **N. Y., Patchogue**—BA 12/21—Bd. Educ. Union Free School Dist. No. 24, Saxton Ave., Oregon Ave. JUNIOR HIGH SCHOOL. $2,350,000. Frederic P. Wiedersum Assocs., 65 Roosevelt Ave., Valley Stream, archts. S. Cararelli Assocs., 65 Roosevelt Ave., Valley Stream, mech. engrs. Kenneth J. Tomann, 450 7 Ave., New York, Zone 1, struct. engr. CD 8/22/61.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, BRIDGE,

A. E. Ottaviano, Inc., 80 Brook St., Croton-on-Hudson, N. Y., CA **$5,000,002**, est. $6,069,000, plate girder bridge, approaches and ramps, conc. deck, roadway 0.721 mi., conc. pavt. 0.1 mi., misc. work 0.02 mi. Int. Rte. Conn. 515, Whitestone Expressway, Contr. 2 (Flushing River Bridge and approaches), Rte. 678, FIWE 61-2, Proj. E1-678-1(67), Queens Co. BA 10/25/61. CA 11/10/61. CD 10/27/61, under LB.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, ROADS,

N. Y.—**The Lane Constr. Corp.**, 965 E. Main St., Meriden, Conn., CA **$1,372,493**, est. $1,463,000, 9 in. c. conc. pavt. 0.87 mi. (1.19 acc.) RRGS plate girder, hy. gr. sep. comp. I-beam, Int. Rte. Conn. 580, Rochester Western Expressway (Rochester City Line to Mount Read Blvd.), Rte. 490, FIC 61-19, Proj. I-490-2(26), Monroe Co. CA 11/9/61;

N. Y.—**Savin Bros., Inc.**, 522 Cottage Grove Rd., Bloomfield, Conn., CA **$4,401,725**, est. $4,475,000, 9 in. c. conc. pavt. 3.94 mi. (3.76 acc.) 3 hy. gr. seps. comp. I-beam Liberty-County Line, Part 1, SH 5223, Liberty-County Line, Part 2, SH 5234, Rte. 17, FARC 61-132, Proj. F-336(17), Sullivan Co. BA 10/26/61. CA 11/10/61. CD 10/27/61, under LB.

▲ **Horn Constr. Co., Inc.**, 2174 Hewlett Ave., Merrick, N. Y., CA **$2,669,281**, reconstr. SUBWAY STRUCTURE between and constr. PLATFORM EXTENS. to Nevins St. and Atlantic Ave. Stations of Lexington Ave. and 7th Ave. Lines, New York City Transit Sys., IRT Div., Contr. No. C-146, BROOKLYN, N. Y. New York City Transit Auth., Rm. 1310, 370 Jay St., New York 1, N. Y. BA 11/3. CA 11/21. CD 11/7/61, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROAD,

Burkholder & Burkholder, P.O. Box 271, Winchester, Va., CA **$1,232,094**, (3 bidders), 11,470 ft. rein.-con. pvt., 24 ft. wide, and three bridges, L.R. 1036(1), Sec. Gettysburg bypass, Rte. 15, Adams Co. BA 10/27/61. CD 11/1/61, under LB.

BUILDINGS—LB & CA

▲ **Lawrence J. Rice, Inc.**, 474 Fulton Ave., Hempstead, N. Y., LB **$3,213,000**, (12 bidders), general contract, 4 story LABORATORY, Meadowbrook Hospital, ELECTRONIC CANCER TREATMENT BLDG., Meadowbrook Hospital, EAST MEADOW, N. Y. Nassau Co., Old County Court House, Franklin Ave., Mineola, N. Y., BA 11/21. CD 11/13/61;

Horowitz Bros., Inc., Robins Lane, Syosset, N. Y., LB **$579,000** (4 bidders), plumbing LABORATORY and ELECTRONIC CANCER TREATMENT BLDG., Meadowbrook Hospital (East Meadow, N. Y.);

United Combustion & Air Conditioning Corp., 400 W. Jericho Turnpike, Huntington, N. Y., LB **$1,065,787**, (11 bidders), heating and ventilating LABORATORY and ELECTRONIC CANCER TREATMENT BLDG., Meadowbrook Hospital (East Meadow, N. Y.);

Herrick Electrical Contg. Co., Inc., 3471 Atlantic Ave., Brooklyn 8, N. Y., LB **$764,333**, (8 bidders), electrical work LABORATORY and ELECTRONIC CANCER TREATMENT BLDG., Meadowbrook Hospital (East Meadow, N. Y.).

▲ **Bd. Educ. Liberty Central School Dist. No. 1**, Liberty, N. Y., rejected bids Oct. 4, general contract JUNIOR-SENIOR HIGH SCHOOL, Buckley St., LIBERTY, N. Y. LB **$2,058,388**. Will re-advertise. CD 10/10/61, under LB.

▲ **Clement S. Crystal, Inc.**, 701 7 Ave., New York 19, N. Y., CA Est. **$1,500,000**, Coronet THEATRE, on top of existing Baronet Theatre, 993-995 Third Ave., NEW YORK, N. Y. Walter Reade, Inc., 251 West 57 St., New York 19, N. Y. CD 7/31/61.

▲ **S. S. Silberblatt, Inc.**, 25 West 45 St., New York 36, N. Y., Owner Builds, **$4,500,000**, 33 story, 162,000 sq. ft. 74 x 81 ft. OFFICE TOWER, 600 Third Ave. and 159-163 East 39 St., northwest corner, NEW YORK, N. Y. CD 8/2/61.

▲ **James Nuckel**, Eckel Rd., Little Ferry, N. J., Owner Builds, **$1,000,000**, 29 HOUSES, Brookside Ave., ALLENDALE, N. J. Harsen & Johns, 60 Westervelt Ave., Tenafly, N. J., archts.

▲ **Gene Novello**, 2326 Gales Court, South Plainfield, N. J., Owner Builds, **$1,250,000**, 65 HOUSES Newman Springs Rd., HOLMDEL, N. J. Dean der Clute, 7 South Ave., West, Cranford, N. J., archt. H. Thos. Carr, 313 State St., Perth Amboy, N. J., engr.

▲ **Howard Seigel**, 141 Main St., Matawan, N. J., Owner Builds, **$7,000,000**, 350 HOUSES, Matawan Ave., MATAWAN, N. J. Gerber & Pancani, 11 Commerce St., Newark, N. J., archts. Raymond P. Wilson Assoc., 46 Paterson St., New Brunswick, N. J., engrs. CD 4/4/61.

▲ **Parchester Land Corp.**, Newman Springs Rd., Lincroft, N. J., Owner Builds, **$1,750,000**, 65 ADDNL. HOUSES, Fox Run on Bannon Hollow Rd., Tall Tree and Fox Hill Rds.; **$1,000,000**, 40 HOUSES, Swimming River Rd., MIDDLETOWN, N. J. Harry Maslow, 48 Westfield Ave., Elizabeth, N. J. and Wm. Chirgotis, 80 Morris Ave., Springfield, N. J., archts.

▲ **Ace Builders Constr. Co.**, 230 Banta Ave., Garfield, N. J., CA Est. **$1,000,000**, general contract Part II and Part III, WEST and NORTH WINGS, HIGH SCHOOL and RESIDENCE, Pine St. and Raritan Rd., ROSELLE, N. J. Diocese of Newark, 33 Mulberry St., Newark, N. J. BA 10/30/61. CD 10/4/61.

▲ **Dorset Contg. Co., Inc.**, Hyattsville, Md., CA **$1,906,000**, JOHN EAGER HOWARD HALL, University of Maryland, BALTIMORE, MD. State, Dpt. P. Imprvts., 301 W. Preston St., Baltimore 1, Md. BA 10/3. CD 10/5/61, under LB.

SOUTH

BUILDINGS—BA

▲ **Ala., Tuscaloosa**—BA 12/7—University of Alabama, P.O. Box 1957, 5 story, 73,000 sq. ft. WOMEN'S DORMITORY, $1,000,000. Lawrence S. Whitten, Brown-Marx Bldg., Birmingham, archt. CD 11/21/61, under LB.

▲ **Ga., Atlanta** — BA 12/7 — Great Republic Holding Corp., 1330 W. Peachtree, NW, OFFICE BLDG. $1,500,000. Plans deposit $100. James C. Wise, Simpson, Aiken & Assocs., 873 Spring St., NW, archts. Bankers Fidelity Life Insurance Co., 1330 W. Peachtree, NW, lessee. CD 9/15/60.

▲ **Ala., Mobile**—BA 12/19—Mobile County School Bd., Courthouse, B. C. Rain JUNIOR HIGH SCHOOL, Cedar Point Rd. $1,200,000. Harry Inge Johnstone, First National Bank Annex, archt. CD 8/3/61.

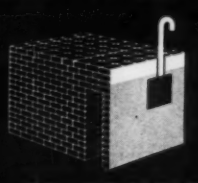
HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—State Hy. Dpt., 1221 East Broad, Richmond, Bids opened 11/15, ROADS,

Va.—**Paul Slusher Co.**, 761 Dommerich Dr., Maitland, Fla., and **Lanford Brothers Co., Inc.**, P.O. Box 5127, Roanoke, Va., and **Sam Finley, Inc.**, 1615 Cleveland S.W., Roanoke, Va., LB **$1,171,706**, grading, paving 3.33 mi. Interstate 64, along line existing US Rte. 69, from 0.56 mi. west to 3.98 mi. west of Clifton Forge, or approx. 1.5 mi. east of Island Ford at Jackson River, Alleghany Co., CD 9/29/61;

Va.—**Bennie Snyder**, P.O. Box 816, White Sulphur Springs, W. Va., LB **$1,798,473**, grading, 3.79 mi. from 0.33 mi. north Botetourt County line to 4.12 mi. north of the county line, Rockbridge Co., CD 9/29/61;

FALLOUT-Free Air



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DIAMOND BLADE SAWING OF CONCRETE

Case Report: NORTH DAKOTA HIGHWAY

COST-$.132 per linear foot

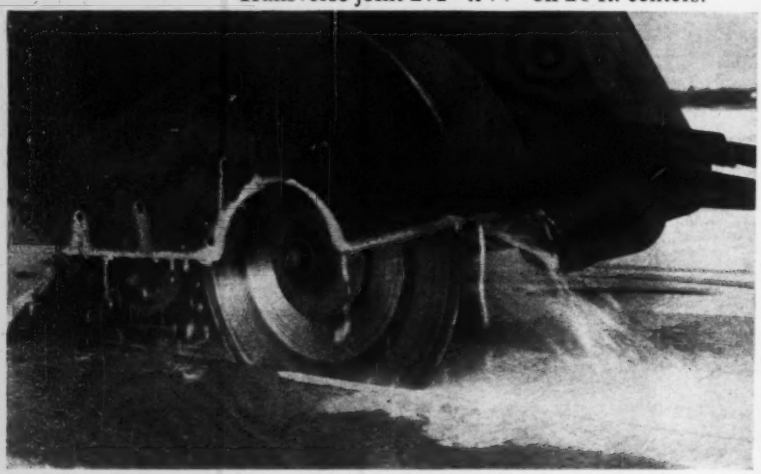
TYPE OF WORK—Concrete Highway

AGGREGATE—Pit Gravel

SAWING OPERATION—Exclusively diamond blades.

TYPE OF DIAMOND—Engelhard Hanovia SND-MB.

DIMENSIONS—Longitudinal joint 2½" x ¼".
Transverse joint 2½" x ¼" on 20 ft. centers.



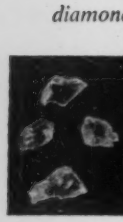
The efficiency of Diamond Blade Sawing operations in concrete highway and runway joint construction is unsurpassed. In addition, economy is acheived in the equally important matter of maintenance.

Savings in maintenance costs are reported as high as 50%. There's good reason for it because *only* the sawed joint can assure maximum uniformity of the concrete in the joint areas where 90% of pavement failures normally originate. Diamond Blade Sawing does not displace aggregate–it removes it and thus eliminates the basic cause of cracking, chipping and spalling.

There are several major advantages afforded by Diamond Blade Sawing in initial paving construction: The pour is monolithic. The installation of joints is an independent operation that neither interferes with nor delays the paving procedure. Joints are cut to exact dimensions by high speed semi-automatic equipment–no need for hand finishing or vibration–ideal wall surface conditions are created for optimum bond with sealer compound.

For detailed information and field-use reports
from state highway officials and contractors, write to
Engelhard Hanovia, Inc., for Report #101.

SND-MB is a result of research that has greatly increased diamond cutting efficiency. Engelhard Hanovia, Inc. is the leading supplier of SND-MB to the manufacturers of diamond blades.



★ENGELHARD HANOVIA, INC.★
INDUSTRIAL DIAMOND DIVISION
113 ASTOR STREET • NEWARK 2, NEW JERSEY

Va.—**Talbott-Marks Co.**, Inc., P.O. Box 308, Clarksville, Va., and **Robert A. Smith Co., Inc.**, Box 305, Farmville, Va., LB **$857,941,** grading, 2.54 mi. Interstate 81 from 4.2 mi. north of Botetourt County line to Rte. 684 near Fancy Hill north of Natural Bridge, Rockbridge Co., CD 9/29/61;

Va.—**Oman Constr. Co., Inc.**, Acklen Park, Box 146, Nashville, Tenn., LB **$1,191,058,** grading, 2.92 mi. Interstate 81 from Marion bypass 3.2 mi. east of Marion to point 4.8 mi. west of Wythe County line, Smyth Co., Co., CD 9/29/61.

Va.—**Oman Constr. Co., Inc.**, Acklen Park, Box 146, Nashville, Tenn., and **R. G. Pope Constr. Co.**, Bristol, Va., LB **$2,417,968,** grading, paving and connections 4.86 mi. Interstate 81 from end of current project 0.39 mi. east of Rte. 80 near Meadowview to point 0.93 mi. east Rte. 91, near Glade Spring, Washington Co., CD 9/29/61;

▲ **GEORGIA**—State Hy. Dpt., No. 2 Capitol Square, Atlanta, Zone 3. Bids opened 11/10, ROADS,

Ga.—**Knox-Rivers Constr. Co.**, Box 311, Thomson, Ga., LB **$528,249,** 1.282 mi. grading, paving, one bridge on Elbert Street Extension in Milledgeville, beginning intersection Vinson Hy., State Rte. 112, and S. Elbert St., extending north on new location to East Montgomery St., Baldwin Co.; LB **$102,027,** 3.351 mi. grading, paving Shoals to Harts Rd. beginning at Shoals to Mitchell Paved Road, extending east and northeast to Warrenton to Mitchell Paved Road, Warren and Glascock Counties;

Ga.—**Lothridge Brothers**, P.O. Box 81, Gainesville, Ga. and **Ballenger Paving Co.**, Greenville, S. C., LB **$1,750,651,** 4.162 mi. grading, paving Interstate Rte. 85 and point 1,500 ft. west of Banks-Franklin County line, Franklin Co. CD 10/31/61.

▲ **LOUISIANA**—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge. Bids opened 10/19, ROAD,

Williams-McWilliams Industries, Inc., Box 584, New Orleans, La., LB **$1,775,630,** (5 bidders), 5,555 cu. yd. washed gravel furnished f.o.b. at various destinations for public roads, SP 703-16-12, St. Landry Parish. CD 10/11/61.

▲† **Williams-McWilliams Industries, Inc.**, 3308 Tulane Ave., Box 584, New Orleans 19, La., LB **$1,775,630,** 9,873,000 cu. yd. Whiskey Bay Pilot CHANNEL ENLARGEMENT, Atchafalaya River Main Channel, Iberville and St. Martin Parishes, CIVENG-16-047-62-50, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. BA 11/15. CD 10/23/61.

▲ **McDowell & McDowell**, Murfreesboro Rd., Nashville, Tenn., CA **$2,250,000,** relocation 16 mi. IC TRACK in Barkley Dam Reservoir, KENTUCKY. Illinois Central Railroad, 135 E. 11 Place, Chicago, Ill., BA 11/1, CA 11/14. CD 11/9/16, under LB.

BUILDINGS—LB & CA

▲ **Tompkins-Archer Builders, Inc.**, 7000 Karden Way, Orlando, Fla., CA Est. **$1,500,000,** 126,000 sq. ft. APARTMENT, COCOA BEACH, FLA. Saturn Apartments, Inc., c/o Broleman & Rapp, archts., 1216 E. Colonial Dr., Orlando, Fla.

▲ **Mathis Constr. Co.**, 1525 Lumpkin St., Athens, Ga., LB **$1,456,706,** PHARMACY BLDG., University of Georgia, ATHENS, GA. Bd. Regents, University System of Georgia, 244 Washington St., SW, Atlanta, Ga. BA 11/14/61. CD 10/13/61.

▲ **Daniel Constr. Co.**, 1109 Prudential Bldg., Jacksonville, Fla., LB **$1,286,800,** (4 bidders), Manatee VETERANS MEMORIAL HOSPITAL, ADDNS., ALTERATIONS, BRANDENTON, FLA. Bd. Comrs. Manatee Co., County Courthouse, Brandenton, Fla. BA 11/15/61. CD 11/8/61.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ **Ill., Chicago**—BA 12/8—Dpt. Purchases, City Hall, Zone 2, GRADING, PAVING, LANDSCAPING, DRAINAGE, South Rte. Expressway, 35th St. to 28th Pl., Proj. 80.68-61-33, $5,000,000. CD 6/21/57.

BUILDINGS—BA

▲ **Ill., Chicago**—BA 12/12—Chicago Housing Auth., 608 S. Dearborn St., Zone 5, complete general constr. three 16 story elevator type APARTMENTS, one 14 story elevator type APARTMENT containing 593 dwelling units, underground utilities, related site imprvs., CHA Project Illinois-2-41, 41st St. and Lake Park Ave. Plans deposit $75. Shaw, Metz & Assocs., 208 S. LaSalle St., Zone 4, archts.-engrs. CD 10/11/61.

▲ **O., Amelia**—BA 12/14—West Clermont School Dist., Ohio Pike, HIGH and ELEMENTARY SCHOOLS, $1,-969,000. Plans deposit $30. CD 9/22/61.

▲† **O., Columbus**—BA About 12/19—U. S. Eng., P.O. Box 59 (830 Broadway), Louisville 1, Ky, CENTRAL HEATING PLANT and HEAT DISTRIBUTION SYSTEM, incl. high temperature water boiler plant, three boilers, mechanical and electrical work and equipment, approx. 17,000 lin. ft. 2½- to 12-in. supply and return overhead high temperature water distribution lines, each boiler will have cap. of 70,000,000 BTU and working pressure of 385 P. S. I., rein.-con., structural steel with concrete black and aluminum panel wall structure, etc., Columbus General Depot, ENG-15-029-62-16, $2,000,000. Plans deposit $10. CD 8/29/61.

▲ **O., Maple Heights**—BA 1/3—Maple Heights Bd. Educ., 5500 Clement Dr., JUNIOR HIGH SCHOOL. $1,200,000. Plans deposit $100 for general contract, $50, for mechanical contract. Lesko Assocs., 1404 E. 9th St., Cleveland, Zone 14, archts. CD 12/6/60.

▲ Ind., Gary—BA 1/22—School City of Gary, 620 E. 10th Pl., BECKMAN JUNIOR HIGH SCHOOL, 23rd and Pierce Sts., $1,500,000; BAILLEY JUNIOR HIGH SCHOOL, 47th and Georgia Sts., $1,500,000. Bennett & Straight, 23830 Michigan Sts., Dearborn, Mich., archts. CD 11/28/60.

HEAVY CONSTRUCTION—LB & CA

▲ **MICHIGAN**—State Hy. Dpt., Mason Bldg., Lansing, Zone 26, ROAD,
Cooke Contg. Co., 1116 Penobscot Bldg., Detroit, Mich., and **C. J. Rogers, Inc.**, 14836 Grand River, Detroit, Mich., CA **$1,212,511**, 1.7 mi. Southfield Freeway from Outer Dr. north to Rotunda Dr., incl. east-west service roads, alterations, constr. and sewer, water and lighting facilities, Allen Park, Wayne Co. CA 11/10. CD 5/25/59.

▲ **MICHIGAN**—State Hy. Dpt., Civic Center, Lansing, Bids opened 11/21, ROADS,
Mich.—**L. A. Davidson**, 213 East St. Joseph, Lansing, Mich., LB **$3,643,021**, 3 mi. freeway incl. 1.2 mi. 6-lane Interstate 75 and 1.8 mi. 4-lane connecting I-75 with Telegraph Rd. southwest of Detroit, Wayne Co.;
Mich.—**Louis Garavaglia**, 24240 Mount Rd., Warren, Mich. LB **$3,564,375**, 1.4 mi. 6-lane John Lodge Freeway Extension from Meyers Rd. to 7 Mile Rd., Wayne Co. CD 11/7/61.

▲ **Owen Ames Kimball Constr. Co.**, 38 Pearl N.W., Grand Rapids, Mich., CA **$1,267,880**, (9 bidders), Lakeside FILTRATION PLANT, Incl. 5 story chemical bldg., pretreatment units bldg., filtration bldg. and high-lift pump station, GRAND RAPIDS, MICH. City, City Hall, 25 Lyon St. N.W., Grand Rapids, Mich. BA 11/9, CA 11/14. CD 11/16/61, under LB.

BUILDINGS—LB & CA

▲ **Mosser Constr. Co.**, 122 S. Wilson Ave., Fremont, O., LB **$1,492,000**, (9 bidders), WOMENS DORMITORY, DINING HALL; LB **$766,000**, (12 bidders), MENS DORMITORY, OBERLIN, O. Oberlin College, Oberlin, O. BA 11/7/61. CD 10/16/61.

▲ **Par Realty, Inc.**, 6505 Ridge Rd., Parma, O., Owner Builds, **$1,250,000**, sixty-five 2 story HOMES both sides Woodrow Ave., between W. 54th and W. 44th Sts., PARMA, O.

▲ **Crane Constr. Co.**, 919 N. Michigan Ave., Chicago, Ill., CA **$18,385,000**, 39 story, 940 unit APARTMENTS, Randolph St. and Lake Shore Dr., CHICAGO, ILL. Jupiter Oils, Inc. c/o Jerrold Wexler, 120 S. LaSalle St., Chicago 3, Ill. CD 7/13/61, under George S. Lurie Co., as owner.

▲ **Johnson & Jacobson**, 213 N. 7th St., DeKalb, Ill., CA **$1,533,500**, general contract PHYSICAL EDUCATION BLDG. for WOMEN, DE KALB, ILL. Northern Illinois University, DeKalb, Ill. BA 10/12/61. CD 10/24/61, under LB.

▲ **MacDonald Constr. Co.**, 1310 S. Grand Blvd., St. Louis, Mo., and **S. M. Wilson & Co.**, 1616 Cleveland Ave., Granite City, Ill., CA Est. **$3,000,000**, 150,000 sq. ft. Eastgate Plaza SHOPPING CENTER, EAST ALTON, ILL. Donald H. Shanedling, Inc., 6505 Wilshire Blvd., Los Angeles, Calif. CD 4/8/59.

▲ **George Sollitt Constr. Co.**, 109 N. Dearborn St., Chicago 2, Ill., CA **$1,900,000**, 46 unit SAND LO BEACH APARTMENTS, 1440 Sheridan Rd., WILMETTE, ILL. Harold H. Lundberg, c/o Wadeford Electric Co., 205 W. Wacker Dr., Chicago 6, Ill. Shaw Metz & Assocs., 208 S. LaSalle St., Chicago 4, Ill., archts. CA about 11/15/61.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲† **Oklahoma**—BA 12/19—U. S. Eng., Box 61, Tulsa, Zone 2, 13.3 mi. ROAD RELOCATION, BRIDGES, CULVERTS, FENCING, RIP RAP, GRAVEL SURF. Eufaula Reservoir, Haskell and McIntosh Counties, CIVENG-34-066-62-62, $1,500,000. CD 11/9/61.

BUILDINGS—BA

▲ **Minn., Minneapolis**—BA 12/14—Minneapolis Housing and Redevelopment Auth., 215 Public Health Center Bldg., three hi-rise 348 unit APARTMENTS for ELDERLY, one SERVICE BLDG., Cedar Ave. S. between 6 and 7 Sts. $3,350,000. Plans deposit $75. Lang, Raugland & Brunet, 802 Wesley Temple Bldg., archts. CD 1/11/61.

HEAVY CONSTRUCTION—LB & CA

▲† **Paul Hardeman**, 10579 Dale Ave., Stanton, Calif., CA **$4,025,000**, completing POWERHOUSE, Eufaula Reservoir, CIVENG-34-066-62-15, OKLAHOMA. U. S. Eng., Box 61, Tulsa 2, Okla. BA 10/24/61. CD 10/27/61, under LB.

▲† **Armstrong & Armstrong** and **J. H. Ryan & Son, Inc.**, P.O. Box 1873, Roswell, N. M., CA **$5,752,110**, concrete DAM and SPILLWAY, Proctor Reservoir, Leon River, near Comanche, ENG-41-443-62-8, TEXAS. U. S. Eng., 100 West Vickory, Fort Worth, Tex. BA 10/31/61. CD 11/2/61, under LB.

▲ **COLORADO**—State Hy. Dpt., 4201 East Arkansas Ave., Denver, Bids opened 11/21, ROAD,
A. S. Horner Constr. Co., 2810 South Havannah, Denver, Colo., LB **$1,923,967**, grading, structures, concrete paving 0.621 mi. East 46 Ave., Colorado Proj. 170-4 (16)285, Denver Co. CD 11/2/61.

BUILDINGS—LB & CA

▲ **Watson Constr. Co.**, 1409 Willow St., Minneapolis, Minn., and **L. C. Halvorson Co.**, 2815 Wayzata Blvd., Minneapolis, Minn., CA **$1,283,000**, 142x142 ft. THEATER, MINNEAPOLIS, MINN. Tyrone Guthrie

(Continued on page 75)

NOWHERE CAN YOU BUY SO MUCH PORTABLE HEAT FOR SO LITTLE!

NEW! HERMAN NELSON HEAT GENERATORS

Hurry up heat when you want it—volume air circulation • Engineered for safe, quiet operation • Automatic ignition, automatic temperature control • 16 hours continuous operation • Burn kerosene, #1 or #2 fuel oil • Stainless steel combustion chamber • Controls and handle on cool end of machine • Complete combustion—no fumes, smoke or open flame • Use wherever you need quick, safe portable heat. A DEMONSTRATION WILL CONVINCE YOU!

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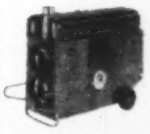
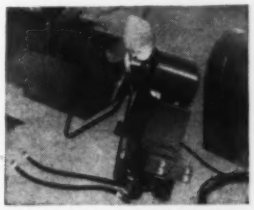


DE LUXE Fully automatic; the finest air heater-blower you can own. Up to 450,000 BTU.

UTILITY Interchangeable gasoline engine or electric motor. Up to 425,000 BTU.

HN 850
125,000 BTU
HN 2250
300,000 BTU



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American Air Filter Co., Inc.
Portable Products Dept. ENR-4, Louisville 8, Ky.

NAME _____
COMPANY _____
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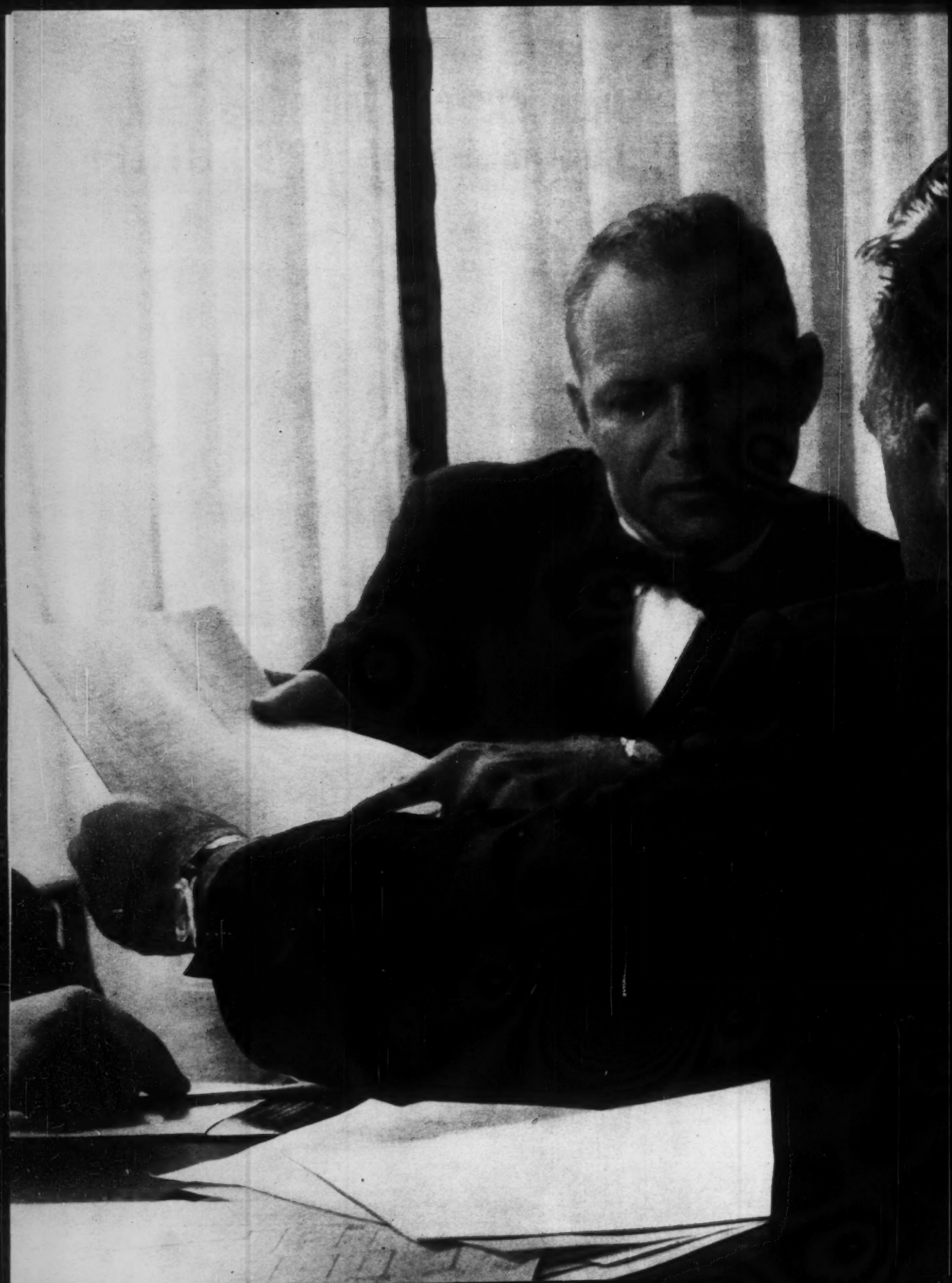
CITY _____ ZONE ____ STATE _____



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Your local IBM Representative can give you complete details on this, as well as previously announced programs, which included Sales Forecasting, Materials Planning, Inventory Management, Plant Scheduling, Work Dispatching, Operations Evaluation, Inventory Management Simulation, and many others.

IBM®
DATA PROCESSING

Architects: Walter Hook Associates; *Structural Engineers:* R. V. Wasdell and J. R. Armstrong; *General Contractors:* Southeastern Construction Co., Goode Construction Corp., F. N. Thompson, Inc., and McDevitt & Street Co. Structural steel was fabricated by Southern Engineering Co., Charlotte, N.C., and Bristol Steel and Iron Works, Bristol, Va. Bristol erected all steel.

all columns outside clear space inside

When completed, the North Carolina National Bank Building in Charlotte will be the largest and tallest all-welded, steel-framed building in the Southeast.

The building will have 16 floors plus a 2-story penthouse. The tower will be in two sections: a main tower for bank personnel and leased offices; a service tower for elevators and stairs.

No interior columns

You can see clear through the Main Tower! 36-in. wide-flange sections span the entire 55-ft width. Not a single column to get in the way of floor arrangements. Partitions can be placed anywhere . . . office space can be arranged as the tenants desire.

Largest columns in the Carolinas

You can also see the largest and heaviest columns ever used in an office building in the Carolinas. The column sections, rolled specially by Bethlehem, are 36¾-in. deep and weigh 369.3 lb per lineal foot. That's 69.3 lb more per foot than the heaviest regular 36-in. wide-flange section.

All-welded steelwork

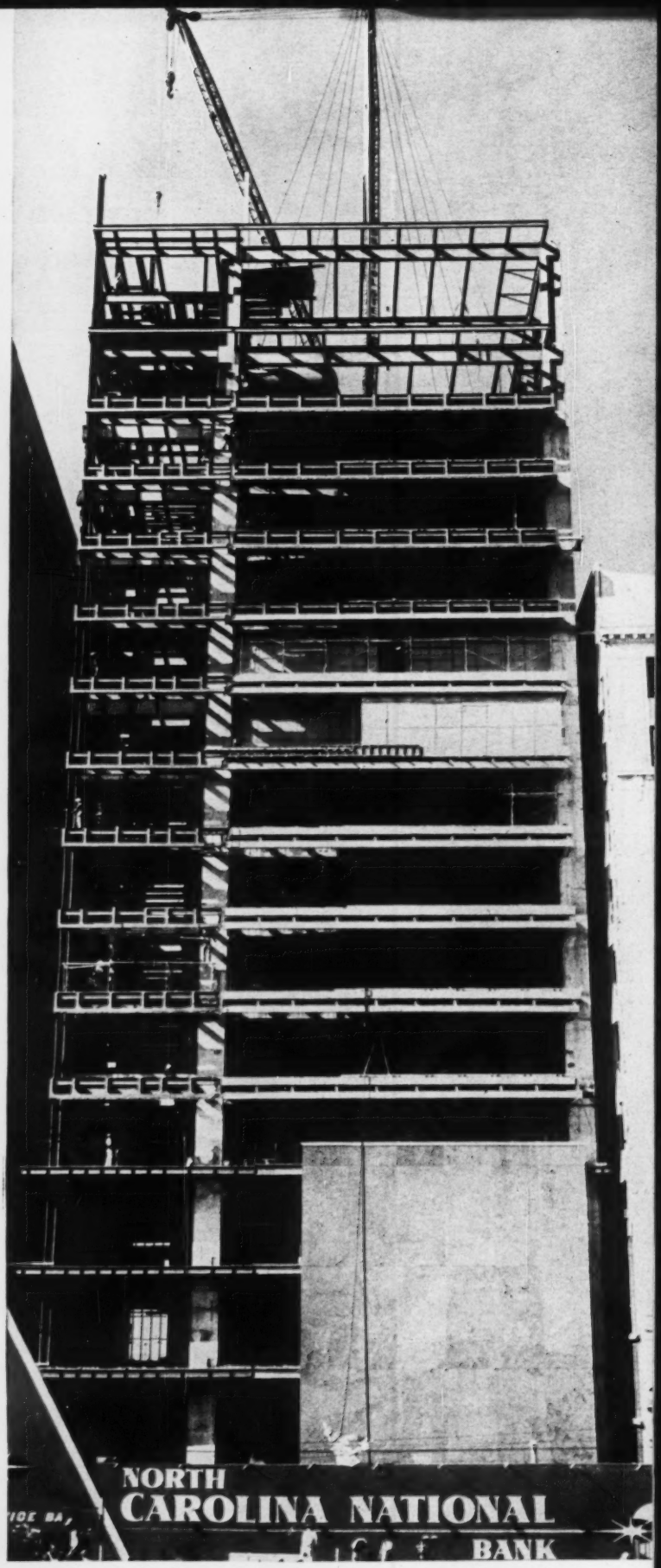
Using these heavy sections as the column core, the columns are welded, built-up members with a 20-in. x 2¾-in. cover plate welded flat on one flange, and two 30-in. x 2¾-in. plates welded perpendicularly to the edges of the other flange. The finished, fabricated columns weigh 1,100 lb per lineal foot.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Steel — For strength . . . economy . . . versatility

BETHLEHEM STEEL



ALL-WELDED. *150,000 lb of welding rods were used in shop fabricating, and 35,000 lb were used in erecting 3,800 tons of Bethlehem structural steel.*

(Continued from page 71)

Theatre Foundation, 725 Vineland Place, Minneapolis, Minn. BA 9/26. CD 10/2/61, under LB.

▲ **C. F. Braun & Co.**, 1000 S. Fremont Ave., Alhambra, Calif., CA, design and construct 200 ton per day, ANHYLROUS AMMONIA PLANT, 4 mi. south of city, adjacent to Mississippi River, MUSCATINE, IOWA. Monsanto Chemical Co., 800 N. Lindbergh Blvd., St. Louis 66, Mo. CA 11/16/61.

▲ **H. A. Lott, Inc.**, P.O. Box 25005, Houston, Tex., CA **$1,660,000**, 4 story and 6 story WOMEN'S DORMITORIES, LUBBOCK, TEX. Texas Technological College, Lubbock, Tex. BA 10/31/61. CD 11/9/61, under LB.

▲ **Suburban Homes, Inc.**, 730 Little York St., Houston, Tex., Owner Builds, **$1,362,000**, 114 DWELLINGS, Delimar Subdivision, Fontaine on Homestead St., and Oakwilde and Chatwood subdivisions, HOUSTON, TEX.

▲ **Colorado Empire, Inc.**, 2625 S. Colorado Blvd., Denver, Colo., Owner Builds, **$2,000,000**, 1 story, bsmnt., brick, 144 RESIDENCES, 82nd and Washington Sts., ARVADA, COLO.

FAR WEST

HEAVY CONSTRUCTION—LB & CA

▲ **NEVADA**—State Hy. Dpt., State Hy. Bldg., Carson City, ROAD,
Charles T. Parker Constr. Co., 6457 N.E. Columbia Blvd., Portland, Ore., CA **$2,406,667** (6 bidders), constr. portion Interstate Hy. System, on Interstate Rte. 15, between 34 mi. northeast of Las Vegas and 2 mi. southwest of Glendale, Clark Co. BA 11/16/61. CD 11/1/61.

▲ **WASHINGTON**—State Hy. Comn., Transportation Bldg., Olympia, Bids opened 11/21, ROAD,
Northwest Constr. Co., Inc., 3950 6th Ave. N.W., Seattle, Wash., LB **$1,387,090**, east approach to Evergreen Point Bridge, King Co. CD 10/31/61.

▲ **Manson-Osberg Co.**, 1132 N. 128th St., Seattle 33, Wash., LB **$6,293,764** (7 bidders), 17,000 ft. 72 in. WATER CONDUIT, concrete Hydro Dam, Lake Creek below outlet of Packwood Lake for Packwood Lake Hydro Project, WASHINGTON. Washington Public Power Supply System, 1511 Tower Bldg., Seattle, Wash. BA 11/16/61. CD 11/8/61.
Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee, Wis., LB **$101,443**, SWITCHGEAR and SWITCHYARDS, Packwood Lake Hydro-Project; LB **$749,959** (3 bidders), 36,700 hp. TURBINE and 2,700 kw. GENERATOR for Packwood Lake Hydro Project (Washington).

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, ROAD,
Gordon H. Ball, Gordon H. Ball, Inc., 300 Camille Ave., Danville, Calif., CA **$5,315,556**, grading, paving to convert 5.1 mi. US Hy. 40 Expressway to six-lane freeway between 1.9 mi. southwest to Vacaville and 1.2 mi. northeast of Hy. Rte. 90, Solano Co. BA 11/15. CD 11/20/61.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, ROAD,
Frederickson & Watson Constr. Co., Jack L. Adams Constr. Co. and **Wade G. Ellis Constr. Co.**, 873 81 Ave., Oakland, Calif., CA **$7,340,424**, grading, paving to construct 16 mi. 8 lane freeway on San Diego Freeway between California Ave. in Signal Hill and Long Beach Freeway, Los Angeles Co. BA 11/9. CA 11/17. CD 11/14/61, under LB.

▲† **Power City Constr. & Equipment Co.**, N. 2602 Hamilton St., Spokane, Wash., CA **$1,158,413**, Keswick-Gas Point Road-Cottonwood 230-KILOVOLT TRANSMISSION LINE, Trinity River Div., Central Valley Proj. Spec. No. DC 5670, CALIFORNIA. Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo. BA 11/2. CD 11/7/61, under LB.

BUILDINGS—LB & CA

▲ **Max Boesiger Constr. Co.**, 185 E. 2nd St. N., Mountain Home, Idaho, CA **$2,500,000**, 220,000 sq. ft. HILLCREST PLAZA SHOPPING CENTER, 1,900 car parking, Overland Rd. between Orchard and Phillipp Sts., BOISE, IDAHO. Daum Development Corp., First National Bank Bldg., Boise, Idaho. Johnson & Underkofler, 1022 12th Ave. S., Nampa, Idaho, engrs.

▲ **John Sellen**, 228 9th St. N., Seattle, Wash., CA **$1,832,100**, general contract 2 and 5 story, 130,000 sq. ft. rein.-con., steel HOSPITAL ADDN., SEATTLE, WASH. Swedish Hospital, 1212 Columbia St., Seattle 4, Wash., BA 9/28/61, CD 10/2/61, under LB;
University Plumbing & Heating Co., 3941 University Way, Seattle, Wash., CA **$875,590**, mechanical contract for 2 and 5 story rein.-con., steel HOSPITAL ADDN., (Seattle, Wash.)

▲ **Luxury Homes**, 905 N. Euclid, Anaheim, Calif., Owner Builds, **$1,899,500**, 145 DWELLINGS, Tract 3670, HUNTINGTON BEACH, CALIF.

▲ **J. G. Watts Constr. Co.**, 672 South Lafayette Park Pl., Los Angeles, Calif., LB **$4,027,000**, (6 bidders), RESIDENCE HALL NO. 4, University of California at Los Angeles, LOS ANGELES, CALIF. Regents of the University of California at Los Angeles, 405 Hilgarde St., Los Angeles, Calif. BA 11/21. CD 10/23/61.

▲ **Utah Constr Co.**, 500 California St., San Francisco, Calif., CA **$1,930,913**, 8 story, International Business Machines OFFICE, Capitol Mall Redevelopment Project, SACRAMENTO, CALIF. Developer Charles E. Brown, c/o Dreyfuss & Blackford, archts., 2729 I St., Sacramento, Calif. BA 11/7, CA 11/17, CD 11/13/61, under LB.

CANADA

BUILDINGS—BA

▲ **Ont., Port Dover**—BA 12/6—Simcoe Dist. High School Bd., 1 story, poured concrete frame, precast exposed aggregate, brick, air conditioned COMPOSITE SCHOOL, with 2 story CLASSROOM WING, St. George St. $1,400,000. Plans deposit $100. Shore & Moffat, 51 Wellington St. W., Toronto, archts. CD 9/25/61, under Ont., Simcoe as project location.

BUILDINGS—SLC

▲ **Sask., Prince Albert**—Hbly Family Hospital, soon lets contract 4 story, 150 bed rein.-con., brick HOSPITAL, $2,235,000. Webster, Forrester & Scott, 209 CPR Bldg., Saskatoon, archts. CD 11/16/61.

HEAVY CONSTRUCTION—LB & CA

▲ **BRITISH COLUMBIA**—British Columbia Govt., Parliament Bldgs., Victoria, Bids opened 11/14, ROAD,
General Constr. Co., Ltd., Granville Island, Vancouver, B. C., LB **$1,288,278** (7 bidders), reconstr. 1.44 mi. Trans-Canada Hy., Yale-Bell Crossing Section, Yale Electoral Dist. CD 11/2/61.

BUILDINGS—LB & CA

▲ **Jarvis Constr. Co., Ltd.**, 9 W. Broadway, Vancouver, B. C., CA **$1,000,000**, rein.-con. SHOPPING PLAZA, incl. supermarket, bank, medical clinic, various shops, 49th and Elliott Sts., VANCOUVER, B. C. Killarney Square Shopping Plaza, Ltd., c/o Dirassar & James, archts., 615 W. Hastings St., Vancouver, B. C. (Correction—contractor.) CD 11/16/61, under CA.

▲ **Smith Bros. & Wilson Ltd.**, 1267 Richards St., Vancouver, B. C., CA Est. **$3,000,000**, 100 x 600 ft. PAPER MACHINE ROOM, GROUNDWORK MILL, VANCOUVER, B. C. MacMillin & Bloedel & Power River Co., 837 W. Hastings St., Vancouver, B. C. CD 9/20/56.

▲ **Cadillac Contracting Assn.**, Suite 802, 99 Avenue Rd., Toronto, Ont., Owner Builds, **$4,000,000**, 307 suite APARTMENT, 4000 Yonge St., TORONTO, ONT. John H. Daniels, 166 Wilson Ave., and Wilfrid Shulman & Assoc., Suite 901, 99 Avenue Rd., Toronto, Ont., archts. Alex Tobias & Assocs., Ltd., 194 Wilson Ave., Toronto, Ont., engrs. CD 5/10/56.

▲ **J. E. Verreault & Fils Ltee.**, 1250 3rd Ave., Quebec City, Que., CA **$1,274,773** (12 bidders), 12 story, rein.-con., stone walls OFFICE, 9 story TOWER, Claire Fontaine and Grande Allee, QUEBEC CITY, QUE. La Laurentienne Cie d'Assurance-Vie, 480 Grande Allee, Quebec City, Que. BA 11/10/61. CD 10/17/61.

PUERTO RICO

BUILDINGS—LB & CA

▲ **Metropolitan Builders**, Box 9004, Santurce Puerto Rico, Owner Builds, **$1,300,000**, 13 floor 40 rein.-con. APARTMENTS, SANTURCE, PUERTO RICO.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **Greece**—BA 2/24—Ministry of National Defense, General Air Staff, Branch C, Directorate C4, Section I & IV, Athens, PETROLEUM, OIL and LUBRICATION FACILITIES, incl. UNDERGROUND PIPE, STORAGE DEPOT and related work. $1,488,095.

AMERICANS ABROAD

▲ **Guy F. Atkinson Co.** and **Ostrander Constr. Co.**, 10 West Orange St., San Francisco, Calif., U.S.A., **S. J. Groves & Sons Co.**, Wesley Temple Bldg., Minneapolis, Minn., U.S.A., **Chicago Bridge & Iron Co.**, 332 S. Michigan St., Chicago, Ill., U.S.A., **Charles L. Harney, Inc.**, 575 Berry St., San Francisco, Calif., U.S.A., **C. J. Langenfelder Son, Inc.**, 8427 Pulaski Hy., Baltimore, Md., U.S.A., and **R. A. Trippeer**, 1055 Harbor Ave., Memphis, Tenn., U.S.A., LB **$354,000,000**, MANGLA DAM, Indus River Basin Proj., WEST PAKISTAN. West Pakistan Water & Power Development Auth., The Pipals, Lower Mall, Lahore, West Pakistan.

BUILDINGS—LB & CA

▲ **Roberts & Schaefer Co., Div. Thompson-Starrett Co., Inc.**, 254 W. 54 St., New York, N. Y., U.S.A., CA **$7,820,000**, design and construct COAL PREPARATION PLANT, Jharia Coal Field, State of Bahar, PATHARDIHI, INDIA. Hindustan Steel Ltd., Govt. India, New Delhi, India.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **ARGENTINA**—BA 12/22—Direcc. Nac. Vialidad, Av. Maipu 3, Buenos Aires, ROAD,
73 mi. basic work and gravel surf. Rte. 143, Carmenza-Gorder w/La Pampa, Mendoza City, Mendoza Province. $1,360,000. CD 9/22/61.

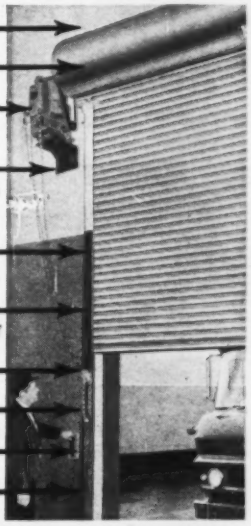
HEAVY CONSTRUCTION—LB & CA

▲ **ARGENTINA**—Direcc. Nac. Vialidad, Av. Maipu 3, Buenos Aires, ROAD,
Ing. Adolfo Trefault, S.A., S. Sebastian, Tierra Del Guego, Argentina, CA **$1,961,000**, est. $1,730,000, 60 mi. basic work, gravel surf. Rte. 3, S. Sebastian-Lago Fagnano, Tierra Del Guego. BA 10/23. CD 8/30/61.

For additional reports see CONSTRUCTION DAILY, REPORTS SECTION

(Proposal Advertisements see pp. 83 to 85)

Kinnear
ROLLING DOORS



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Concrete Reinforcing Steel Institute
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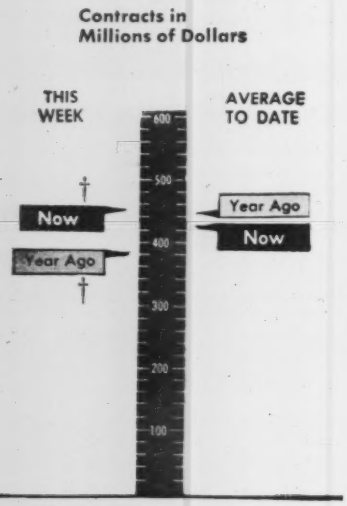
Construction Scoreboard

This Week . . .



AMOUNT OF CONTRACTS LET

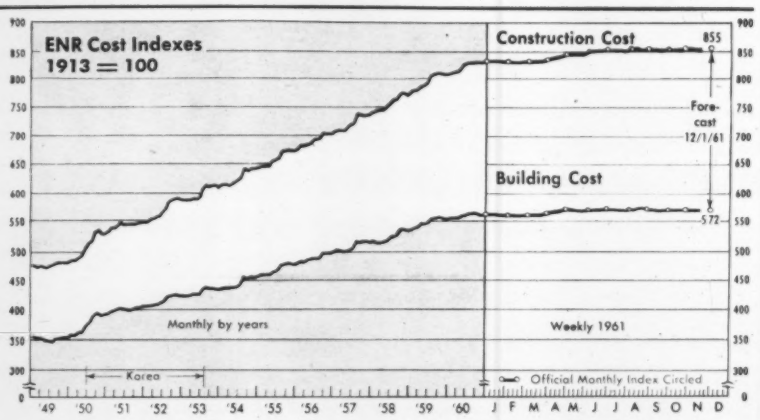
Contracts Awarded In 50 States By Type	This Week millions	Cum. 48 wks 1961	Chge '60-'61 %
All Heavy Construction	$449.8†	$20,629.7	− 3
By Ownership			
PRIVATE	226.7	10,226.4	− 9
PUBLIC	223.1	10,403.3	+ 5
State & Municipal	192.4	8,231.0	+ 7
Federal	30.7	2,172.3	− 1
By Type of Work			
PUBLIC			
Waterworks	11.9	384.9	−10
Sewerage	13.5	756.9	+35
Bridges*	24.2	624.7	−17
Highways	78.7	3,499.7	+10
Earthwork, Dams & Waterways	22.3	761.0	+ 8
Buildings:			
Excl. Housing	63.2	2,454.7	+ 6
Housing	0.2	755.0	+13
Unclassified	9.1	1,167.5	−11
PRIVATE			
Buildings:			
Mass Housing	82.3	4,757.7	− 9
Commercial	64.4	2,408.6	+0.4
Industrial	73.1	2,644.4	+ 1
Unclassified	6.9	414.6	−57

*Includes Private bridges †4-day week

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of Nov. 23 millions	Cum. 47 wks 1961	Chge '60-'61 %
Corporate Securities	$115.3	$3,281.3	− 5
State & Municipal:			
All Except Housing	235.3	6,293.7	+ 7
Housing	0	126.6	−36
Federal Loans	1.2	228.3	+31
Federal Aid	0	3,535.7	+10
Total Nonfederal	$351.8	$13,465.6	+ 4
Federal Appropriations:			
Projects in U. S.	0	3,448.1	+ 9
Out-side U. S.	0	145.4	− 9
Total New Capital	$351.8	$17,059.1	+ 5



ENR INDEXES (1913 = 100), 20-cities average	Week of Nov. 23 1961	% Change from Oct. 26 1961	% Change from Nov. 24 1960
Construction Cost	855.06	+0.1	+2.9
Building Cost	570.48	+0.1	+1.6

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

Latest Month . . .

BACKLOG OF PROPOSED HEAVY CONSTRUCTION

	October 1961 (millions)	Percent Change from last Month	Year
Total U. S. (ENR reported)	$126,324	+0.4	+1.5
By Ownership—			
Private	58,048	−0.2	+3.7
State & Municipal	54,003	−0.1	+0.7
Federal	14,273	+4.6	−3.5
By Type of Work—			
Waterworks	3,100	−0.3	+6.6
Sewerage	4,349	+0.3	+9.1
Bridges	3,144	+0.5	−4.5
Highways	12,938	+0.1	−4.5
Earthwork, Dams and Waterways	12,303	+3.1	+0.9
Public Buildings	22,753	+0.6	+1.9
Industrial Buildings	18,255	+0.5	+0.2
Commercial Buildings	28,993	−0.7	+6.6
Unclassified, Private	10,800*	−0.2	+2.2
Unclassified, Public	9,689	+0.7	−4.5

* Includes Private Bridges, $112 million

FLOW OF NEW PROJECTS INTO THE BACKLOG

	1961 Oct. (millions)	1961 10-Months (millions)	Percent Change from 1960 Oct.	10-Mos.
Total U. S. (ENR reported)	$2,290	$17,950	+30	− 6
By Ownership—				
Private	976	10,281	+21	− 3
State & Municipal	598	6,348	+ 5	− 4
Federal	716	1,321	+86	−32
By Type of Work—				
Waterworks	23	547	−61	+65
Sewerage	100	794	+73	+41
Bridges	36	227	+54	+ 7
Highways	163	1,085	+250	−46
Earthwork, Dams and Waterways	413	785	+90	+28
Public Buildings	450	3,641	+54	+ 2
Industrial Buildings	330	3,205	+121	+ 9
Commercial: Mass Housing	315	3,338	− 8	−24
Other Building	226	2,933	−16	+16
Unclassified, Private	105**	805†	+120	+14
Unclassified, Public	129	590	−50	−53

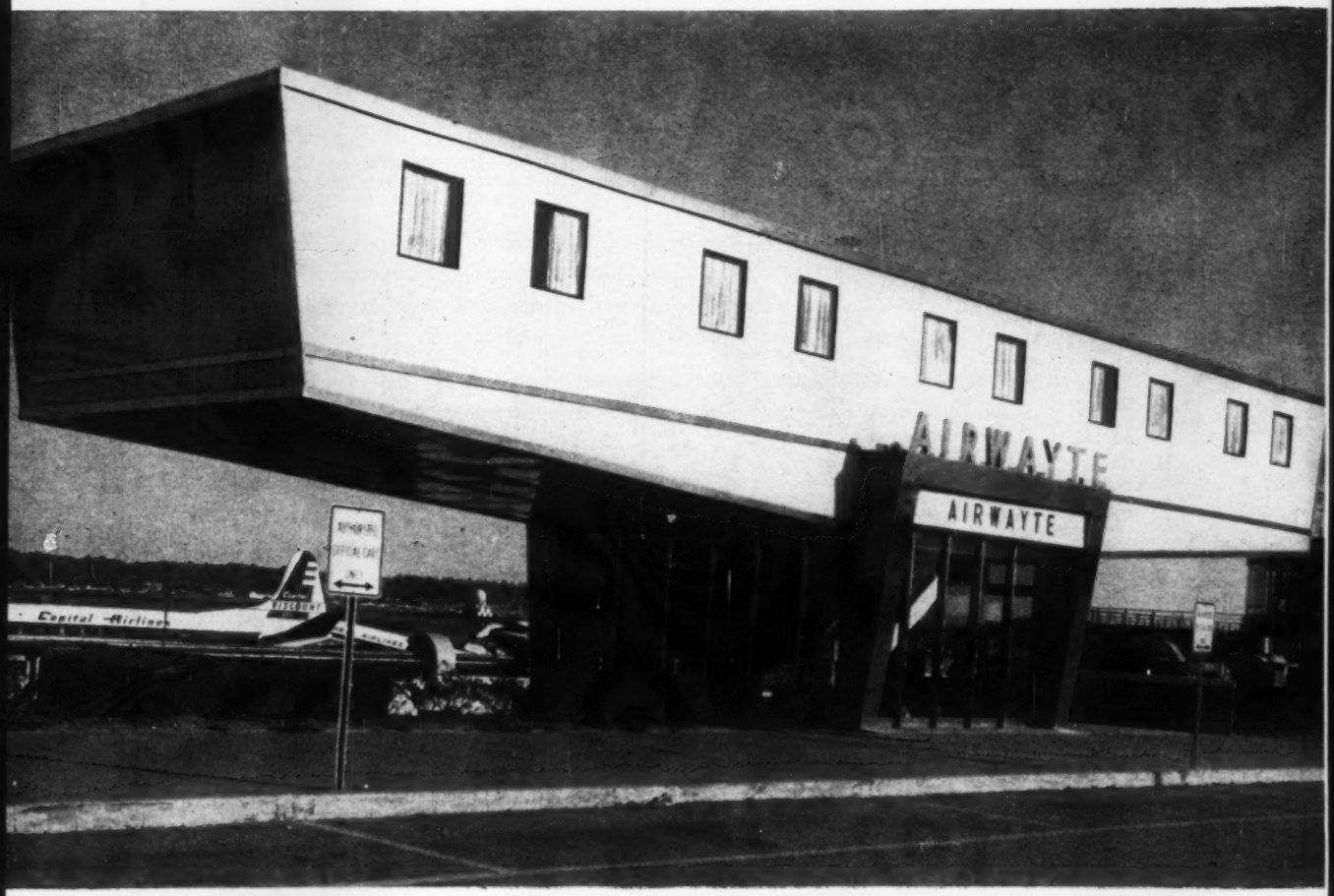
** Includes Private Bridges, $14 million
† Includes Private Bridges, $14.5 million

FLOW OF PROJECTS OUT OF BACKLOG INTO CONTRACTS

Total U. S. (ENR reported)	953	9,530	+ 3	+ 2
By Ownership—				
Private	432	3,555	− 7	− 6
State & Municipal	459	4,650	+18	+11
Federal	62	1,325	−16	− 4

skyborne motel flies on four RAYMOND piles

Owner: Airwayte International, Inc.
Designed by: American Bridge Div., U. S. Steel Corp.



A fresh accent to the jet age, the wing-shaped Airwayte Motel at Washington Airport is unusual in several ways. First, of course, all the rooms are up in the air. Then, each section stands on four Raymond-driven piles, a remarkably small number for a building of this size. And finally, the whole foundation was started and *completed* between Christmas and New Year's Eve. ■ The point is that Raymond is ready to tackle any sort of foundation job, whether it calls for 8, or 800, or 8,000 piles. Every project is a big one to the contractor, and Raymond treats each one with equal care and all possible speed. ■ Whatever foundations your projects may require, remember Raymond. We're equipped with men and materials to build economically and rapidly. Give us a call and we shall be happy to consult with you.

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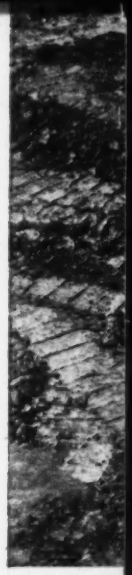
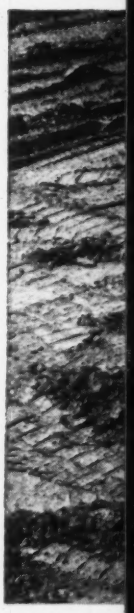
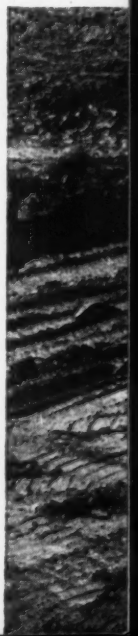
Foundations and Specialized Construction in America ● Complete Construction Services Abroad

NOW...ALLIS-CHALMERS BRINGS YOU

NEW HD 7G FULL POWER STEERING BRAKING SHIFTING







A new combination of full power control—hydraulic steering, braking, and shifting—brings new output capacity and ease of operation to Allis-Chalmers 1¾-yard HD-7G. With a 100-hp turbocharged engine and torque converter drive, there's plenty of smooth, production-boosting power in this outstanding tractor shovel.

Easy! Power steering and power brakes—not only new ease of operation . . . but reduced maintenance and unusually long-life service as well! The reason—steering clutches and brakes run in a complete oil bath. Runs cool, with minimum brake adjustment, no steering clutch adjustment necessary at all!

Economical! Allis-Chalmers *7000* Turbocharged engine—delivers 100 net hp from a combustion system that has established itself as the most efficient in the industry. Controlled turbulence and open chamber combustion design provide a thorough mixing of air and fuel for fast, even, complete combustion . . . matchless fuel economy.

Fast work cycles with Power-Shift—The 7G combines smooth torque converter performance with single-lever Power-Shift transmission. You *shift on-the-go*—from any forward speed to any reverse speed, with an infinite number of speeds through the entire working range of up to 5.9 mph forward, up to 4.2 mph reverse.

Stable! Most track in its class—With 7-ft, 1⅝ in. of track on the ground, 62-in. tread, and 15-in. track shoes, the HD-7G has the extra stability to handle heaped loads with speed and safety . . . whatever the job, whatever the terrain.

Smooth! Exclusive Ground-Speed-Control—No need to limit your speed by shifting into lower gears. Set your speed automatically with Ground-Speed-Control. If you want the tractor to run at 2 mph, it moves at that speed with or without load, up to full engine power. There is no speed-up when the load is lightened, no slowdown when it is increased. You get smooth operation throughout the work cycle . . . top production all day long.

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Performance
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Wearability
Ease of maintenance
Reliability

Your Allis-Chalmers dealer will be glad to arrange a full-scale demonstration on your job at your convenience. *Allis-Chalmers Construction Machinery Division, Milwaukee 1, Wisconsin.*

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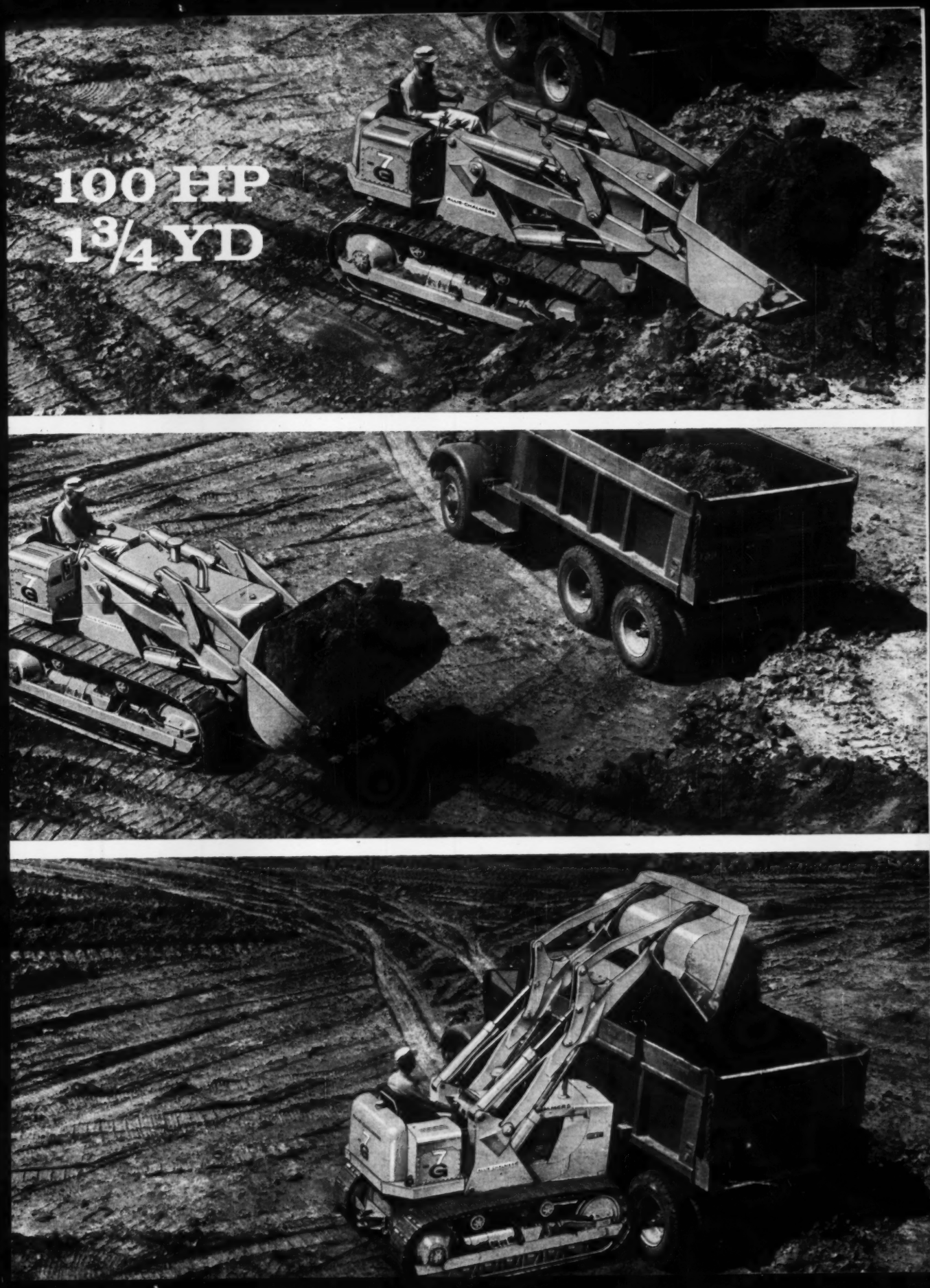
POWER FOR A GROWING WORLD


100 HP
1 3/4 YD

"I don't know who you are.

I don't know your company.

I don't know your company's product.

I don't know what your company stands for.

I don't know your company's customers.

I don't know your company's record.

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Union Seeks to Protect Local Autonomy

The right of an autonomous local union to negotiate its own labor contract, free from the dictates of its parent international union, is on trial in Baltimore, Md.

The issue is being litigated by the International Brotherhood of Electrical Workers' old Local 28, which was ousted by the international last August for striking electrical contractors in Baltimore without permission to do so from the international. The IBEW has established a new local (No. 24) to replace the old one (ENR Sept. 14, p. 87).

The ouster is being challenged in two federal court cases. A decision is expected by the end of December. National Labor Relations Board proceedings against Local 28 and against the local contractors are also pending.

A spokesman for Local 28 said last week that the basic issue in the federal court cases is whether the IBEW's general president, "by attempting to institute a policy of writing national labor agreements" in the electrical industry, is violating the IBEW's constitution.

The constitution, the spokesman claims, has stripped the president of that power and given the IBEW's autonomous local unions the right to bargain their own wages and working conditions.

The IBEW claims the issue is whether a local union can violate with impunity a lawfully adopted constitutional provision that seeks to stabilize labor relations by preventing strikes by local unions except when authorized by the international.

At the heart of the problem is the electrical industry's labor-management machinery for the peaceful settlement of labor disputes, the Council of Industrial Relations. IBEW labor contracts typically require submission of disputes, including collective bargaining ones, to the Council. Local 28 has followed this procedure in the past. It claims it has been "burned" several times and that the system has effectively destroyed local bargaining.

In earlier litigation, Local 28 successfully terminated its old labor contract and obtained a ruling that it was no longer obligated to submit its dispute with local contractors over a new contract to the Council. The local rejected the IBEW's request that it resort to the Council and struck. The strike is still on. The IBEW punished the local by revoking its charter on the grounds that it struck without IBEW permission.

The local union's position is that the IBEW, by refusing to sanction the strike, was trying to compel use of the Council, thus denying the local its constitutional right to negotiate the terms of its own contract.

If the local wins on this point, it will presumably win the second case, which seeks restoration of its charter. This case is a class action under the Landrum-Griffin law and is based on alleged violation of the rights of the local's members. The other case is filed under the Taft-Hartley Act.

Company Wins Contracting-Out Dispute

Another chapter in the bitter dispute between craft and industrial unions over maintenance work was written last week, when Fibreboard Paper Products Corp. of Emeryville, Calif., won a $309,000 verdict against the United Steelworkers of America and one of its local unions.

The damage suit stemmed from a 1959 decision by Fibreboard to have its maintenance work done by an outside contractor rather than by its own employees (as it has done in the past), who were represented by the steelworkers union. The contractor was Fluor Maintenance, Inc.

The union struck against the change. In the litigation that followed, Fibreboard filed a $1.3-million damage suit against the union, later reducing its claim to $554,000.

In a separate action, Fibreboard's switch to maintenance by contract was unsuccessfully challenged by the union before the National Labor Relations Board. The contracting-out had occurred after the steelworkers' labor contract for maintenance workers expired. The company's defense was that the change had been made solely for business reasons (a saving of some $250,000 a year) and had been accomplished without violating the organizational rights of its employees, or any labor contract rights of the steelworkers (ENR Dec. 17, 1959, p. 239).

When the steelworkers picketed the plant, Fibreboard claimed the strike was illegal per se and illegal because of alleged violence that ensued.

(In a collateral protest against building trades' participation in the construction industry's promotion of maintenance by contract, the union also picketed the 1959 convention of the AFL-CIO Building and Construction Trades Department in San Francisco.)

An attorney for the union said the Fibreboard verdict would be appealed. The jury's award includes $285,000 for loss of business and $24,000 in punitive damages.

Lyons, Jr., Heads Ironworkers

The leadership of the ironworkers' international union has passed into the hands of the younger generation with the election of John H. Lyons, Jr. as general president.

Mr. Lyons, 42, succeeds his father, John H. Lyons, who died on October 26. His election to fill out his father's unexpired term was the unanimous action of the union's executive council.

The new president, who holds a bachelor of science degree in mechanical engineering from the University of Missouri School of Mines and Metallurgy, became a general vice president of the union in 1958 and assistant to the president last April.

Mr. Lyons' broad experience in the construction industry began in 1937, when he joined the Cleveland local as an apprentice. Following World War II, in which he served in the Air Force, Mr. Lyons worked for one of the nation's largest ornamental metal fabricating companies. He joined the staff of the international union as a general organizer in 1954, and was named to head the union's branch office in Washington, D.C., the following year.

Mr. Lyons, Sr., had been general president of the International Association of Bridge, Structural and Ornamental Iron Workers for the last 13 years and was the only man in the union's 65-year history to have served in all three of its top offices.

Money-Saving Insurance Draws

Package insurance, a comprehensive protection plan that wraps workmen's compensation and public liability coverage into one neat bundle for owners and general contractors, heads into controversy in New York State.

The argument pits the specialty subcontractors against general contractors and both public and private owners.

Although insurance companies write the greatest amount of such policies on jobs in New York City, major projects in other parts of the nation can use the single-package insurance policy. Such a policy covers a $200-million project under way on the West Coast.

What happens in New York State, therefore, may determine the extent to which owners and general contractors use the coverage in other parts of the nation. In any event, the economics of premiums—and also state laws—generally limit package insurance to jobs costing $15 million to $20 million or more.

Competition, however, has introduced a new trend. Brokers now offer package policies for much smaller projects, $3 million in many cases.

The package issue comes to a boil this week in New York City at a public hearing called by the State Insurance Department, which administers the laws governing insurance. The Department called the hearing on an application by the Insurance Co. of North America to provide package insurance rates to the New York City Housing Authority.

The door thus opened, trade associations representing employers walked in to register their protests against the entire concept. The opponents of such insurance include associations representing plumbing, heating, air conditioning, electrical, sheet metal, and painting and decorating subcontractors.

Under the package insurance policy (also known as a "wrap-up" plan) an owner or a general contractor buys the liability and workmen's compensation coverage from a single insurance company. This permits granting by the insurance company of a favorable reduction in contractual premium charges. Other specific rules and laws further reduce the over-all cost of the coverage to the owner. Big savings also result from the elimination of the stringent "hold harmless" clauses in an owner's contract that stipulate such indemnities be insured. The additional premium charges reflect in the cost of the job.

The hold-harmless stipulations provide a measure of protection against suits brought by subcontractors' employees against an owner or a general contractor. They charge that damages or injuries resulted on a job site because the principals failed to provide a safe place to work, which, under New York State labor law, must be provided. As a result, the claimant must only establish that the owner or general contractor failed to comply with the law. He does not have to prove negligence on the part of either.

Because of the prevalence of such claims—relatively hard to disprove—hold-harmless agreements became mandatory. And from this developed the package insurance plan. Under it, an owner or a general contractor buys and pays for the necessary insurance, but the insuring company prepares separate policies for each contractor, subcontractor and sub-subcontractor.

And in such cases where the owner or general contractor intends to carry a package policy, he instructs the subcontractors to exclude the cost of insurance from their bid prices. The sub, however, may have to guarantee his field labor estimate, to the extent that he pay any additional premium charge that the general contractor or owner must assume if the sub overruns his labor estimate.

Few argue that the package plan fails to provide generous savings. New York University says it saved $220,000 on its building program of the last two years by obtaining package insurance.

The savings come to owners or general contractors because of the economies effected by the insurance company writing the policies. Volume business rings up savings, some of which the insurer passes along to the customer. Paperwork is held to a minimum and the insurer can administer an effective and unified accident-prevention program on the job.

The plan also eliminates from subcontractor bid prices the cost of subs' insurance upon which they superimpose their normal overhead and profit factors. In addition, when the owner or general contractor carries the package insurance, he collects any premium discounts, dividends and return premiums. When the subcontractor carries his own insurance, such discounts, dividends and return premiums accrue to him, not the owner, even though the sub's price anticipated maximum insurance outlays.

The subcontractors object to what they believe to be an unfair practice. Package insurance imposes a higher cost on subcontractors, according to Vincent Foy, executive secretary of the Association of Contracting Plumbers of the City of New York.

The subs argue that the practice prevents them from getting lower insurance rates otherwise available through group insurance, credits and discounts. And because a sub's relationship with an insurance broker or company suffers when his volume of insurance purchasing drops, subcontractor groups say they encounter difficulty in getting

Roadbuilders Cut

Contractors' low bids in the first six months averaged 8.7% below engineering estimates for federal-aid Interstate, primary and urban highways.

Savings from estimates in some states soared to an average of 20%, according to the Bureau of Public Roads. Alaska, Delaware, New York and North Dakota, counted themselves in this big-saving group.

By contrast, total low bids climbed slightly above highway department estimates in only Colorado and Hawaii, 4.9% and 1.3% respectively.

On the basis of the average number of bids per project, the stiffest competition developed in six states: South Dakota, 11.9 bids per project; North Dakota and Massachusetts, 9.6 bids per project; Colorado and New Jersey, 8; and Connecticut, 7.8 bids per project.

Interstate projects drew more bidders

Kiewit Appeals

Peter Kiewit Sons Co. of Omaha and 15 of that corporation's subsidiaries have appealed Internal Revenue Service claims against them totaling more than $20 million.

The parent company heads the money-due list. It owes $13.6 million in taxes for the years 1948-57, the government contends. Kiewit denies the debt.

IRS claims against the various companies question their charges for depreciation, depletion allowances and income reported from joint construction ventures and equipment rental. The companies dispute all of the allegations in

Subs' Fire

other types of insurance required on a construction job.

These types include insurance for completed operations and automobile liability. Brokers balk at handling certain parts of the insurance of a job when excluded from handling the major insuring functions, subs report.

And a major complaint of the subs involves claims settlements. According to the subcontractors, they fail to get adequate representation in the settlement of claims. In some cases, claims have been decided against a subcontractor without his even knowing a claim had been filed, they report.

Their Bid Prices

on the average than secondary jobs let in the first half. On Interstate jobs, 7.2 bids per project came in, compared to 5.9 per secondary project. But low bids on Interstate jobs averaged a bit closer to engineering estimates, only 9% lower compared to an average 9.7% lower for secondary projects.

Big secondary road jobs attracted more bidders than smaller ones, although the difference was small. Low bids on the large jobs, however, fell much further below estimates than on the smaller jobs. Eight jobs going for $1 million or more averaged 11.6% under estimates, while all 1,557 jobs fell an average of 9.7% below estimates.

Large Interstate projects tended to attract slightly fewer bidders than small Interstate projects. The low bids in the middle range—$1 million to $2 million—came closest to engineering estimates.

$20-Million Bill

petitions seeking a redetermination of the tax claims.

In some cases, the companies involved wrote off machinery in about two years, claiming high-speed operation for unusually long hours in all types of weather and terrain wore machinery out in the brief period stipulated.

In addition, temporary and inexperienced employees added to the wear, says the company. Some items were also classed as obsolete because of major improvements in equipment made since the time of company purchase, says the firm.

OFFICIAL PROPOSALS

Bids: December 7, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 7th day of December 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 7, J. C. NORTON, District Engineer, 444 Van Duzee Street, Watertown, New York						
Clinton (Rte. 11)	D.A. 61-7	Rouses Point-Lake Champlain Bridge, S.H. 1956 Proj. Rad 13(4)	0.05	Widening of Toll Area Misc. Work	$700 Plans $5	$12,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bid deposit, the execution of the contract and bond shall conform to the provisions of the Highway Law, as set forth in the "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

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District of Columbia—Bridge Construction—November 16, 1961. CONSTRUCTING APPROACH STRUCTURES NO. 1201, 1202 and 1203 FOR THE THEODORE ROOSEVELT BRIDGE, FEDERAL-AID INTERSTATE PROJECT NO. I-66-1(15)0, Invitation No. C-6267-H, consist. of approx. 2,543 cu. yds. Class BB AE concrete in rigid frame structure and wingwalls below masonry; 1,062 cu. yds. of Class A Dimension Granite Masonry, incl. backing concrete; and 2,393 cu. yds. of Class C Granite Masonry, incl. backing concrete. Bid forms, plans and specifications are now available from Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EST, December 20, 1961, in Room 424, 499 Penn. Ave., N.W.

District of Columbia—School Construction—November 17, 1961. CONSTRUCTION OF NEW ELEMENTARY SCHOOL, 11th and Clifton Sts., N.W., Washington, D. C. (Invitation No. C-6289-B). Bid forms, plans and specifications are now available from Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EST, December 14, 1961, in Room 424, 499 Penn. Ave., N.W.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5708) will be received at Fargo, North Dakota, until 10 a.m., Central Standard Time, January 9, 1962, for furnishing labor and materials for Stringing conductors and overhead ground wires for Garrison-Jamestown 230-kilovolt Transmission Line, Transmission Division, North Dakota, Missouri River Basin Project. Location Mercer, McLean, Burleigh, Kidder and Statsman Counties, North Dakota. Principal items are assembling and attaching 1,963 insulator assemblies; stringing 137.6 miles of line 3 ACSR conductor; stringing 137.6 miles of line two ½-inch overhead ground wire; and other work. Completion time 210 days. For particulars address Bureau of Reclamation, P. O. Box 1993, Fargo, North Dakota; P. O. Box 2553, Billings, Montana; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.70 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.
SEND COPY TO: Official Proposal Division, Engineering News-Record Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Bids: December 21, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y., Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 21st day of December 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, F. J. FULLER, District Engineer, 353 Broadway, Albany, New York						
Albany (Int. Trg. Rte. 787)	FIC 61-22 FAC 61-23	Interstate Rte. Conn. 540 (Albany: Route 9W to Green St.-Cont. 2) City of Albany: Southside Route Arterial Highway Proj. EI-787-3(49), U-1132(3)	1 34 (3 05 Acc.)	9" Cem. Conc. Pavt., 2 @ 37' Var. = 3.51 Mi. Asph. Conc. = 0.48; Misc. Work = 0.40 3 HGS Comp. I Beam, 1 HGS Comp. I Beam & Plate Gird.	$250,000 Plans $10	$4,727,000
Schenectady (Int. Trg. Rte. 890)	FIC 61-24	Interstate Rte. Conn. 550 Edison Ave. to Broadway. Proj. I-IG-890-5(20)	0 30	Demolition of Buildings	$2,200 Plans $5	39,000
DISTRICT No. 2, L. KETCHUM, District Engineer, 109 No. Genesee Street, Utica, New York						
Hamilton Warren (Rte. 28)	FARC 61-167	Indian Lake-County Line, S.H. 1100 Indian Lake-North River, S.H. 8152 North Creek-North River, S.H. 1515 Proj. F-478(2)	12 24 (2 00 Acc.)	Asph. Conc. Type 1A = 12.24 Mi. Bit. Double Surf. Treat. = 2.00 Mi. Reinf. Conc. Closed Box Bridge Rehabilitate Truss & I Beam Bridge	$285,000 Plans $5	5,222,000
Oneida	M 61-9	Nine Mile Spillway on Erie Canal One Mile North of the Village of Oriskany	....	Rehabilitation of Spillway Misc. Gate & Channel Work	$18,000 Plans $5	335,000
Oneida	U. S. 108	New Gates—Lowering Sills and Lower App. Slab & Misc. Work	....	Lock 20E, Erie Canal, Cary's Corners	5% of Bid Plans $10	Confidential
DISTRICT No. 3, E. E. TOWLSON, District Engineer, 333 E. Washington St., Syracuse, New York						
Oswego (Rte. 176)	FARC 61-166	Granby Roads (Bowens Cors. Section) S.H. 653 Proj. S-621(1)	0 04	Asphalt Conc. Corrugated Plate Culvert	$800 Plans $5	15,000
DISTRICT No. 4, B. F. PERRY, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe	M 61-16	Rochester: Court Street Dam on Genesee River	....	Cleaning and Painting Sector Gates 3 & 4	$1,400 Plans $5	24,000
DISTRICT No. 5, N. W. KRAPF, District Engineer, 65 Court Street, Buffalo 2, New York						
Erie	FATS 61-18	Buffalo: Kensington Expressway Arterial Highway, Section 1 (East Tupper Street to East Utica Street) Cont. 4 Proj. U-377(23)	1 91	Traffic Signs	$2,000 Plans $5	36,000
Erie	FAC 61-5	Buffalo: Kensington Expressway Arterial Highway Section III (Northland Ave. to Fillmore Ave.) Proj. U-377(21)	0 66	Demolition of Buildings	$6,000 Plans $5	105,000
Niagara (Int. Trg. Rte. 190 Rte. 18D)	NIE 61-5 FINIE 61-4 FARC 61-129	Interstate Route 506, Niagara Expressway-Contract 5 (North Grand Island Bridge to Gill Creek) Porter Ave. Pt. 1, S.H. 1756, Porter Ave. Pt. 2, S.H. 1858 Proj. EI-EIG 190-1(43); S-606(2)	4 99 (5 74 Acc.)	9" Cement Conc. Pavt., 2 @ 24' Var. = 5.93 Mi. Asph. Conc. = 4.68 Mi.; Misc. Work = 0.12 Mi. 5 H.G.S. Comp. I Beam; 2 H.G.S. Comp Plate Girder; 1 R.R.G.S. Comp. I Beam; 1 R.R.G.S. Comp. Plate Girder	$615,000 Plans $10	11,176,000
DISTRICT No. 6, W. J. DENNIS, District Engineer, State Office Building, 30 West Main Street, Hornell, New York						
Allegany (Rte. 408 & 305)	FATC 61-4	Cuba-Friendship, S.H. 5174, Obi-Cuba, S.H. 965 Proj. F-294(3)		Traffic Signals	$1,500 Plans $5	26,000
Steuben	FASS 61-15	Hammondsport-South Pulteney, C.R. 76 Proj. S-594(1)	0 55	Asphalt Concrete	$10,000 Plans $5	192,000
DISTRICT No. 7, J. C. NORTON, Acting District Engineer, 444 Van Duzee Street, Watertown, New York						
Lewis (Rte. 12)	P.A. 61-2	Boonville-Port Leyden, Part 2, S.H. 8472	0 23	Grading, Drainage and Misc. Work	$500 Plans $5	9,000
DISTRICT No. 8, M. N. SINACORI, District Engineer, 28 Dutchess Turnpike, P. O. Box 551, Poughkeepsie, New York						
Columbia Rensselaer (Rte. 20)	R.C. 61-158	New Lebanon-Brainard, S.H. 615 Brainard Station, S.H. 5108	6 93	Subsealing Cement Conc. Pavt.	$4,500 Plans $5	82,000
Rockland	FASS 61-16	Little Tor Road (Collyer Ave. to New Hempstead Rd. and Phillips Hill Rd. to South Mountain Rd.) Proj. S-311(2)	2 05	Asphalt Conc. Twin Box Culvert	$32,000 Plans $5	577,000
Westchester (Int. Trg. Rte. 287)	FICWETS 61-2	Interstate Route Conn: 520 Cross Westchester Expressway Proj. I-287-2(29)	10 79	Additional Traffic Signs	$3,000 Plans $5	54,000
DISTRICT No. 9, J. C. FREDERICK, District Engineer, 71 Frederick Street, Binghamton, New York						
Broome (Rte. 26)	FARC 61-165	Vestal-Vestal Center-Choconut, S.H. 8331 Proj. F-U-482(5)	1 93	Asphalt Concrete	$88,000 Plans $5	1,602,000
Delaware Broome (Rte. 17)	FARC 61-168	Hales Eddy-Hancock, S.H. 5167 Deposit-Hales Eddy, S.H. 5045 Windsor-Deposit, S.H. 5338 Deposit, S.H. 265 Proj. F-FG-336(18), F-FG 344(30)	6 70 (5 75 Acc.)	9" Cement Pavt., 2 @ 24' Var. = 8.65 Mi.; Asphalt Conc. = 1.25 Mi.; Bituminous Stab. Course = 2.51 Mi. Misc. Work = 0.04 Mi.; 4 H.G.S. Comp. I-Beam; 2 H.G.S. Comp. Welded Plate Gird; 2 Bridges Comp. Welded Plate Gird; 4 RRGS Comp. I Beam; 1 RRGS Prestressed Concrete	$600,000 Plans $10	11,367,000
Delaware Ulster (Rte. 28)	FARC 61-163	Fleischmanns-Margaretville, S.H. 239; Griffin Corners, S.H. 36; Pine Hill-Griffin Corners, S.H. 5177 Proj. F-659(9)	4 27	Asphalt Conc. = 4.22 Mi.; Misc. Work = 0.05 Mi. Composite Plate Girder Bridge; Reinf. Conc. Closed Box Bridge	$123,000 Plans $5	2,251,000
DISTRICT No. 10, A. M. SARR, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Nassau	FAWOBE 61-3 FARC 61-162	Wantagh-Oyster Bay Expressway, North Hempstead Turnpike, S.H. 9018, New Bridge Road, S.H. 546 Proj. U-1110(5), U-541(12)	....	Demolition of Buildings	$1,100 Plans $5	20,000
Nassau	FAWOBETS 61-4	Wantagh-Oyster Bay Expressway, Contract 2A (Hempstead-Farmingdale Turnpike, S.H. 9064 to Old Country Road, C.R. 4) Proj. U-1110(6)	4 47	Traffic Signs and Delineators	$5,500 Plans $5	97,000
Queens	FAVWE 61-5	Van Wyck Expressway Extension, Contract 4 (Northern Boulevard-Long Island Expressway) Proj. U-UG-1085(23)	1 14 (0 66 Acc.)	Cem. Conc. Wearing Surface (St. Slab) 1.51 Mi. Cement Conc. Pavt. = 0.03 Mi.; Asph. Conc. = 0.17 Mi.; Misc. Work = 0.09 Mi.; Viaduct—75 Comp. I Beam; 20 Precast Prestressed Conc.; 2 Comp. Built Up Steel Girders	$650,000 Plans $10	11,802,000
Suffolk	PSC 6638 PSC 7296	Elimination of Grade Crossings of the Long Island Railroad with Various Streets in Babylon Mantauk Division Central Branch Team Yard	3 56 (0 51 Acc.)	Track Relocation, R.R. Station, Signal Tower and Misc. Work = 2.58 Mi.; Cement Conc. Pavt. = 0.43 Mi.; Asph. Conc. = 1.06 Mi.; 7 RRGS Plate Gird; 2 RRGS I Beam; 1 Slab Viaduct; 2 Temp. Trestles Wood Bents	$400,000 Plans $10	7,532,000

(Continued on opposite page)

OFFICIAL PROPOSALS

(Continued from opposite page)

Suffolk	HSP 61-2	Hecksher State Parkway, Contract 3 (Southern State Parkway to Montauk Highway)	6.68 (2.49 Acc.)	8" Cement Conc. Pavt., 2 @ 37± = 5.44 Mi.; 24' Widening = 1.19 Mi.; Access = 2.49 Mi.; Misc. Work = 0.05 Mi.	$170,000 Plans $5	3,050,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bid deposit, the execution of the contract and bond shall conform to the provisions of the Highway Law, as set forth in the "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: December 19, 1961

Ocean Highway Bridges Deck Reconstruction—Bascule Spans

CAPE MAY COUNTY BRIDGE COMMISSION
CAPE MAY COURT HOUSE, NEW JERSEY
Dated: November 21, 1961

Sealed bids for the reconstruction of the bascule decks of the Ocean Highway Bridges will be received by the Cape May County Bridge Commission in its offices at Cape May Court House, New Jersey, until 2 P.M. Eastern Standard Time, December 19, 1961 and then at said place, publicly opened and read aloud.

The work consists generally of replacing the existing timber deck on the bascule span of the Townsends Inlet, Great Channel, Grassy Sound and Middle Thorofare Bridges, with a new open-grating steel deck and new additional supporting steel stringers, and placing end-welded studs on the existing open grating steel deck on the bascule span of the Corson Inlet Bridge, as shown on the Plans.

The Information for Bidders, Proposal, Contract, Contract Bond, Plans and Specifications may be examined at the office of the Commission, First National Bank Building, Cape May Court House, New Jersey, and at the office of Howard, Needles, Tammen & Bergendoff, Consulting Engineers, 99 Church Street, New York 7, New York.

Contract documents will be furnished for $5.00 for each set, upon application to the Commission or to the Consulting Engineers. The payment will not be refunded and contract documents are not required to be returned.

The Contract will be awarded or the proposals rejected within thirty (30) days from the date of opening proposals. The Commission reserves the right to waive any informalities in and to reject any or all bids.

Cape May County Bridge Commission
Bernard W. Maxwell, Chairman

Bids: January 17, 1962

Corporacion De Obras Sanitarias De Asuncion Paraguay

November 20, 1961

NOTICE TO BIDDERS

Sealed Bids are invited for furnishing and installing the mechanical and electrical equipment for a new diesel engine-driven generator and miscellaneous equipment in the Water Works System for the City of Asuncion, Paraguay, South America. The work includes furnishing, delivering to Asuncion, and installing:

a. A 500 KW Diesel engine-driven generator.
b. Additional switchgear cubicles.
c. Power factor correction equipment.
d. Three, 300 HP or larger, stepless primary resistor motor starters.
e. Furnishing and delivering, without installation, 23 and 6 KV outdoor line equipment.

Bids should be addressed to the Corporacion de Obras Sanitarias de Asuncion, and mailed or delivered to the office at Avenida España 575, Asunción, Paraguay, S. A. so as to be received not later than January 17, 1962, at 9:00 A.M. Bids will be opened publicly at that Office at the time stated, and all Bidders are invited to be present. Award of a contract will be made to the qualified Bidder submitting the most advantageous Bid.

The Contract Documents give specifications for the materials to be furnished.

Plans, Specifications and Contract Documents may be obtained from Rader and Associates, 100 Biscayne Boulevard, South, Miami 32, Florida, U.S.A., upon payment of $35.00. Additional copies of plans, when required, may be had upon payment of one dollar a sheet.

Each Bid must be accompanied by a Bid Guaranty in the amount of five per cent (5%) of the contract price. The successful Bidder will be required to furnish a Performance and Payment Bond in an amount not less than ten per cent (10%) of the Total Contract Price. The Surety Company furnishing the bid guarantee and the Performance and Payment Bond must be authorized to do business in the U.S.A., and the Surety Company and the form of the Guarantee and Performance and Payment Bond must be satisfactory to the Corporacion de Obras de Asuncion, Paraguay.

An equipment performance guarantee bond will be required.

Corporacion de Obras Sanitarias de Asuncion reserves the right to reject any or all bids.

CORPORACION DE OBRAS SANITARIAS DE ASUNCION

Bids: January 10, 1962

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, N. Y., as follows:

Until 11 A.M. Wednesday, January 10, 1962.

For Narrows Bridge Contract No. NB-12, Brooklyn Approach, Brooklyn, New York City.

Each bid must be accompanied by a deposit in the amount of $250,000.00.

The contract includes grading, drainage, concrete piers, retaining walls and abutments, seawall, steel viaducts and bridges and paving.

Plans, specifications and contract documents may be purchased at the office of the Authority for $130.00, which will not be refunded.

Make Plans Accessible to Distant Bidders

Plans and specifications for inspection by distant bidders may be filed at any of Engineering News-Record offices without charge. Or a sufficient supply may be deposited at such of our offices as seem desirable subject to your usual requirements in the matter of deposits, etc. (We assume full responsibility for return of plans or collection and return of deposits).

Many contractors depend entirely upon the

OFFICIAL PROPOSAL COLUMNS

of

Engineering News-Record

for Opportunities to bid.

They might not see your announcements if printed elsewhere.

You undoubtedly want their bids on your contracts. Make sure of them on your next contract.

EMPLOYMENT NATIONAL COVERAGE OPPORTUNITIES

DISPLAYED RATE

The advertising rate is $45.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

DECEMBER 14TH ISSUE CLOSES DECEMBER 4TH

UNDISPLAYED RATE

$2.70 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

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Send NEW Ads and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 645 N. Michigan Ave.
SAN FRANCISCO 11: 255 California St.

• POSITIONS VACANT

Graduate Civil Engineer to learn Prestressed Concrete Fabrication. Recent graduate will be considered. Moving expenses paid to relocate in central Wisconsin. Opportunity involves layout, design of shop drawings, some jobsite work, estimating and quantity take off and field sketches. Good possibility to grow with company. Reply to P-7723, Engineering News-Record, with resume of education and experience.

Draftsman—experienced reinforcing bar detailer and checker. Permanent position with established steel producer. Submit resume of experience, references, and salary expected. All replies confidential. P-7811, Engineering News-Record.

Senior Engineer for general municipal work. Starting salary $6750 with 5 yearly increments to $8250. Must have degree in Civil Engineering. Send summary of experience to City Manager, City Hall, Watertown, New York.

Wanted—Civil Engineer—Experienced in subdivision calculations, design of streets, water and sewer systems, storm drains, etc. Send resume and salary requirements to Ralph L. Kraemer, Western Engineers, Inc., Las Vegas, Nevada.

Wanted—Experienced, competent engineers to design water works, sewers, water and sewage treatment plants. State age, education, experience, salary expected, when will report. Correspondence confidential. P-7816, Engineering News-Record.

C.P.A.—Years of experience in construction and taxes. Must be top man for top, steady position. P-7712, Engineering News-Record.

Structural Engineer—Architectural, Civil, or Mechanical Engineer interested in conducting research on uses of light-gage steel in commercial and residential structures and associated building applications. Work involves development of program, design, analysis, production techniques and performance testing. Large Research Laboratory, Pittsburgh, Pennsylvania. Background in research or product development desirable. M.S. or B.S. degree required. Submit resume and salary requirements to P-7768, Engineering News-Record.

Engineers and Designers—one or two years of experience in water supply, water distribution, sewerage or sewage treatment plant design. Salary commensurate with ability. Address reply with resume to: O'Brien & Gere, Consulting Engineers, 400 East Genesee Street, Syracuse 2, New York.

Soils Engineer—Masters degree and four years experience. Assist in running consulting engineering office, start after January 1st. $9000 per year. ETCO Engineers and Associates, 10601 Airline Highway, Baton Rouge, Louisiana.

Field Engineer — Permanent position with established Midwest consulting firm for man thoroughly qualified and experienced in all branches of building construction. Moving expenses paid. Electrical or process engineer preferred. Send complete resume to P-7633, Engineering News-Record.

Office Manager and Estimator-Medium size general construction firm Eastern N. Y. S. Send photo and complete resume direct to Machnick Construction Co., Inc. 7 Oxford Rd., Troy, N. Y.

• POSITIONS VACANT

Construction-Superintendent, excavation concrete and related works for large power plant; two years; Caribbean area. P-7921, Engineering News-Record.

Chief Estimator — Expanding contracting firm seeking experienced qualified man to head estimating staff. Engineering background essential. Must be well experienced in estimating commercial and industrial buildings (federal or private) $1 to $5 million Class and must presently be employed in estimating work. Firm located in Southwestern part of United States. State age, experience, education and salary expected. P-7922, Engineering News-Record.

City of San Jose has openings for: Engineer I. Excellent opportunity for young civil engineers in fast growing municipality. Accredited degree in civil engineering or passage of E.I.T. (Senior students may take examination) Age 21-40, U.S. Citizenship, $517-$646 per month. Out of state examination can be arranged. Apply: Civil Service Department, Room 211, City Hall, 801 North First Street, San Jose, California.

Hydraulic Engineer. To head hydraulic engineering section of Central Engineering Department of large paper company. Power system has six power dams plus storage reservoirs. Experience in preparation of Federal Power Commission applications desirable but not necessary. Apply to Manager of Engineering & Research, Great Northern Paper Company, Millinocket, Maine.

Assistant to Superintendent of Public Works, Poughkeepsie, New York. Minimum Requirements: 1. Civil Engineer, New York State License. 2. Five years field and office experience, in highway sewer, water distribution engineering. Submit application with complete resume of education and experience to: Kenneth E. Pearce, City Mgr. Poughkeepsie, New York.

Chief Design Engineer, degree in Mechanical, Structural or Civil Engineering plus minimum five years in charge of medium to large mining, contracting, process or chemical plant design office. Location South America with large U.S. mining company. Transportation, housing, liberal vacations and wide range fringe benefits. All replies acknowledged. Send complete resume to P-7905, Engineering News-Record.

General Superintendent. Management opportunity with New York construction company. Experience in estimating, proposal preparation and sub-contract negotiations on lump sum projects. Reply in full confidence to P-7875, Engineering News-Record.

Sanitary Engineer-Project Engineer for design of water supply and sewerage systems including treatment plants. BS and PE required. Salary open. Consulting Engineer, Connecticut location. Send resume and salary requirements to P-7907, Engineering News-Record.

Soils Engineers—Highway design and construction supervision for consulting Engineer. MS and PE required. Salary open. New England location. Send resume and salary requirements to P-7910, Engineering News-Record.

Assistant Sanitary Engineer (Design)—N. Y. State Dept. of Public Works seeks sanitary engineers with design experience. Salary $7360 to $8910. Requires one year of experience in the design of sanitary facilities and five additional years of pertinent training and/or experience. Restricted to residents of N. Y. State. For details write to Recruitment Unit, Box 47B, N.Y.S. Dept. of Civil Service, The State Campus, Albany 1, N. Y.

• POSITIONS VACANT

Civil Engineers—Highway and drainage designers for Consulting Engineering firm located in New York City. BS plus 2 years experience. Salary open. Send resume and salary requirements to P-7914, Engineering News-Record.

Assistant Tax Valuation Engineer—with the N.Y.S. Dept. of Public Works. Salary $7360 to $8910. Requires 6 years of engineering valuation experience or 12 years of field or maintenance engineering experience. Engineering education may be substituted on a year for year basis. N. Y. State residence is not required. For details write to Recruitment Unit, Box 50A, N.Y.S. Dept. of Civil Service, The State Campus, Albany, N. Y.

The City of Fort Worth Water Department has position openings for four graduate engineers, one Civil Engineer I and one Civil Engineer II for office designs, research and field construction of sanitary sewers, one Civil Engineer II or III as Resident Engineer on a large expansion of a sewage treatment plant and one Chemical Engineer II to supervise industrial waste studies. Engineers II and III must have professional engineer qualifications. For further information on the positions, experience and educational requirements and salaries, contact the Personnel Director, City of Fort Worth, Texas.

• EMPLOYMENT SERVICES

Hundreds of $7,000-$35,000 Executive positions available. U.S.A.—Overseas. Get free report. National Employment Reports, 105 W. Adams, 830-B, Chicago 3.

• POSITIONS WANTED

Construction Supt. Heavy Construction. PW-4482, Engineering News-Record.

General Supt., Proj. Mgr. Hvy. Const. roads, bldgs, bridges, flood control, tunnels, pipelines, sewage disp. Civil, Mech. PW-7787, Engineering News-Record.

Executive, 17 yrs const exp. efficient administrator mgr acct atty, employed. PW-7808, Engineering News-Record.

Layout Eng. or party chief-clerk of works, diversified expr., will travel, location immaterial—single. PO Box 949, Hollywood, Fla.

B.S.C.E., P.E., 33. 6 yrs. exp. sewers, hwys, insp. West, Southwest area. PW-7752, Engineering News-Record.

Construction Manager: Excellent and extensive background. Fully qualified all phases building construction. Estimating, purchasing, contract negotiation, field staffing and supervision. Good organizational and administrative ability. Age 45. Full resume and references available. PW-7766, Engineering News-Record.

Construction Manager & Superintendent thoroughly experienced all types of and including heavy construction. Excellent & extensive background. Will send references for personal interview consideration. Overseas job acceptable. PW-7846, Engineering News-Record.

Waterworks Engineer (B.Sc.) Experienced in design, construction and operation seeks overseas assignment. So. America or Africa preferred. Write to PW-7831, Engineering News-Record.

Equip. Supt.: heavy, const. equip. exp. in rebuilding, cost and parts records, fleet dispatch, preventative maint. program. PW-7830, Engineering News-Record.

1961 MSCE. Employed in Bridge Design will design complex indeterminate structures, folded plates, shells, buildings, bridges, prestress, or plastic analysis. Programming IBM-704. $6150. PW-7873, Engineering News-Record.

(Continued on opposite page)

City Planners
AND
Highway Engineers

Field & Office
Survey Personnel

Salary commensurate with ability.

Openings at Rochester, Pennsylvania and Jackson, Mississippi

Interested Personnel Mail Resume To

PERSONNEL DEPARTMENT

MICHAEL BAKER, JR., INC.

Consulting Engineers

Rochester, Pennsylvania

or

NORTHSIDE STATION

P.O. Box 9997 Jackson, Mississippi

★ *Expanded West Virginia Road Program Offers Opportunities for EXPERIENCED ENGINEERS*

Highway Design and Construction—Soils—Materials Testing—Urban Planning—Bridge Design

★ *YOUR RESUME HELD IN STRICT CONFIDENCE* ★

Starting Salaries From: $6,000 to $10,000

Retirement, vacation and sick leave benefits. Reply with resume for possible interview to: N. W. Goodman, P.E., West Virginia State Road Commission, Charleston, West. Va.

WEST VIRGINIA
State Road Commission
Charleston, West Virginia

• *POSITIONS WANTED*

(Continued from opposite page)

Executive Hydraulic Dredge Civil Engineer desires connection with dredge firm or dredge owner. Full time, project or consultation basis. Over 25 years experience dredge management, field investigation, cost estimates. No family, location immaterial. PW-7895, Engineering News-Record.

American Struct.-Mech. Engineer—now working in Italy. Age 41, single, 21 yrs. divers, liaison, field, design exp. Position desired in Europe. Zaffaroni, Via Nullo 24, Milano.

Complete Supervision & Contract Admins. 24 yrs. exp. all phases of hvy. constr. incl. estimates & methods, major projects U.S. & O.S. PW-7923, Engineering News-Record.

Professor structural and architectural engineering, shells, mechanics, mathematics, graphics. Teaching experience with distinguished university; seeks teaching position. PW-7894, Engineering News-Record.

Foreman or Assistant Supt. Road Construction, age 43. 8 years experience—supervision and grading experience. PW-7897, Engineering News-Record.

Capable Administrator—Experience in & knowledge of construction and bldg. products sales. BSCE age 38. Family—will relocate. PW-7903, Engineering News-Record.

Liaison Engineer: Field Engineering Supervisor & Troubleshooter between design/manufacture & manufacturing/construction including inspection and final testing of all type equipment pertaining to bridges, dams, open-pit/subterranean mining, power and heavy processing plants, piers and graving docks. Co-ordinator of sub-contract operations to prime contract schedules. PW-7906, Engineering News-Record.

• *SELLING OPPORTUNITY WANTED*

Well Established Sales Engineering Firm in industrial construction field in Gulf Coast area are seeking additional lines in allied fields for sales representation for territory Northwest Florida to Louisiana state line. RA-7904, Engineering News-Record.

INDUS BASIN SCHEME
MANGLA DAM CONTRACT

Applications are invited from qualified CIVIL ENGINEERS for the following appointments in connection with the supervision of a very large contract including two major earth dams, a large spillway and a hydro-electric power station for an initial installation of 300 MW.

(a) **DEPUTY CHIEF RESIDENT ENGINEER** (CONTRACTS) to be responsible under the Chief Resident Engineer for contractual and other matter.

Applicants must have had extensive experience in the preparation of forecasts, budgets, progress reports, etc., also processing supporting documents for Contractors' Certificates.

(c) **PROGRESS & CERTIFICATION ENGINEER** to assist the Deputy Chief Resident Engineer (Contracts).

Applicants must have had good experience on the administration of contracts and the preparation of progress reports.

(e) **ENGINEER IN CHARGE OF TRAINING** to be responsible for training Pakistani personnel.

Applicants should preferably have a good Honours degree in Civil Engineering, with sound practical experience in surveying setting out works, measurement, concrete and earthworks construction, reinforced concrete design and soil mechanics.

(b) **RESIDENT ENGINEER** to be responsible under the Deputy Chief Resident Engineer (Technical) for supervising approximately one quarter of the civil engineering work.

Applicants must have had extensive experience as Resident Engineer on contracts, preferably on earth dam construction or on soft rock tunnelling.

(d) **ENGINEER IN CHARGE OF CONCRETE LABORATORY** to be responsible for an extensive programme of concrete mix design investigations and for the testing work required for approximately 1,800,000 cubic yards of concrete.

Applicants must have suitable academic qualifications, and must also have had extensive experience in concrete laboratories, and in concrete mix design and control.

(f) **SECTION ENGINEER.**

Applicants must have had 4 years experience on working sites.

(g) **THREE ASSISTANT ENGINEERS.**

Applicants must have had two years experience on working sites.

*(All candidates must be able to speak and write English).

Salaries will depend upon the applicant's age and experience. Consolidated net salaries after payment of Pakistani taxation and net annual increments of salary will be respectively as follows:

Post (a) £4000-£4400 increments £200
Post (b) £3500-£3900 increments £200
Post (c), (d) & (e) £3000-£3300 increments £150
Post (f) £1700-£2000 increments £150
Post (g) £1400-£1600 increments £100

Appointments will be for a period of 2 years with the option, subject to the approval of the project consulting engineers, of extending them to 4 years after one year's service.

Free basic furnished accommodation with air conditioning facilities, free passages for applicant and family, medical and other concessions, also home leave with full pay approximately every 16 months for those whose contracts are extended.

Successful applicants will be in the employ of the project consultants, Messrs. Binnie, Deacon & Gourley, and will be required to take up the appointments during the first half of 1962.

Written applications, with age and full particulars including salary of last or current appointment, (and giving designation of appointment applied for), with names of 2 referees to be sent to:

Messrs. R. E. B. WILLCOX & CO.

CROSBY HOUSE 35-37, GREAT ST. HELENS, LONDON. E.C.3.

not later than 18th December, 1961, marking envelope "MANGLA". Interviews will be held in London after Christmas and, if required to attend, the applicant will be paid out-of-pocket travel expenses. For applicants resident in Europe or Overseas required to attend for interview, special arrangements will be made.

CIVIL ENGINEER WANTED

Kern County Water Agency has opening for engineer-manager. Salary $1200-$1600 month. Administrative experience and ability necessary. For specifications write Kern County Water Agency, Civic Center, Bakersfield, California.

Structural Steel Sales Engineer

Large Cleveland structural steel company needs salesman. Must have civil engineering background and college degree. Must have experience in estimating, bidding, developing new accounts through architects, contractors, engineers, etc.

P-7872, Engineering News-Record
645 N. Michigan Ave., Chicago 11, Ill.

PROJECT SUPERINTENDENT

STEAM ELECTRIC STATION—OVERSEAS

To supervise construction and start-up of 50,000 kw station in Far East. Heavy power plant construction experience required at same level of responsibility. CE or ME university degree preferred. Local living allowance and family accommodation. Tour starts immediately. This is a responsible position with a reputable consulting engineering firm. Send complete resume and reference to:

P-7870, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

SEARCHLIGHT SECTION

CLASSIFIED ADVERTISING

BUSINESS OPPORTUNITIES - EQUIPMENT - USED or RESALE

DISPLAYED RATES

The advertising rate is $25.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vert. on one col., 3 columns—30 in. to a page.
EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

DECEMBER 14TH ISSUE CLOSES DECEMBER 4TH

UNDISPLAYED RATES

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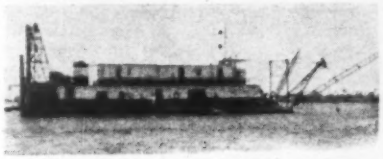

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What Goes on Here?

One of the most absurd statements of these confusing times appears in an advertisement of the National Rural Electric Cooperative Association stating that the cooperatives set up by the federal Rural Electrification Administration are outstanding examples of free enterprise. The reason given for this astounding claim is that the customers of the cooperatives pay a small membership fee and are thus owner stockholders.

Overlooked is the fact that the great bulk of the capital of the cooperatives comes from the REA in the form of loans of federal tax money. The cooperatives pay 2% interest which is about 2% less than the federal government has to pay. So the real stockholders are the U.S. taxpayers, who subsidize these cooperatives. And to keep the record straight, among these U.S. taxpayers are the free private enterprise utilities whose tax bill is nearly ten times as large as that of the cooperatives.

In this same Alice in Wonderland vein is the report that the REA has just made a new kind of subsidized loan to the Alabama Electric cooperative to construct a 66,000-kw steam power plant and over 700 miles of transmission lines so that it will not have to purchase electricity from private utilities. It is called a "security" loan, meaning that it is made to assure the co-ops "a permanent and effective place in the American power industry," according to Norman M. Clapp, REA administrator, as reported in the St. Louis Post-Dispatch. Guaranteeing the success of the electric co-ops may or may not be good social welfare business on the part of the federal government, but it is certainly not, by any stretch of the imagination, free enterprise.

And to cite one more example of fuzzy federal financing, the Community Facilities Administration of the Housing and Home Finance Agency, recently decided that the city of Charleston, W. Va., was eligible for a hardship loan. The city had planned to sell $4 million of sewer bonds through a private investment firm that had won them in competitive bidding for an interest rate of 3.945%. Instead the CFA offered to buy the bonds and charge only 3.375% interest, again less than the federal government had to pay to borrow the money, and so representing a subsidy by the U.S. taxpayer. Donald I. Rogers, financial editor of the New York Herald Tribune, calls this dishonest financing, and it is difficult to quarrel with this judgment.

CFA financing was set up to help cities whose credit was so bad that they could not obtain loans at reasonable rates in the normal financial market. Even though Charleston's credit was good enough to borrow money at less than some federal bonds yield, CFA decided arbitrarily that "reasonable" was 3.375% or lower. Another interpretation of a reasonable interest rate that might occur to a taxpayer, however, would be one that would be no less than the federal government itself had to pay to borrow money. This Charleston case shows how laws enacted to stimulate private enterprise can be used to promote unnecessary federal encroachment on private business.

These strange goings-on are worth a passing thought now and then by the construction industry, which often benefits from the expenditure of federal tax money. This thought is that the construction industry, in most of its facets, is also free, private enterprise, and as such it helps pay the taxes that the federal government spends. When this spending tends toward the unwise and the reckless, it is well to know about it.

The Weakest Link

It is time for state highway departments and other agencies engaged in contract construction to strengthen one of the weakest links in the owner-engineer-contractor chain: the construction inspector.

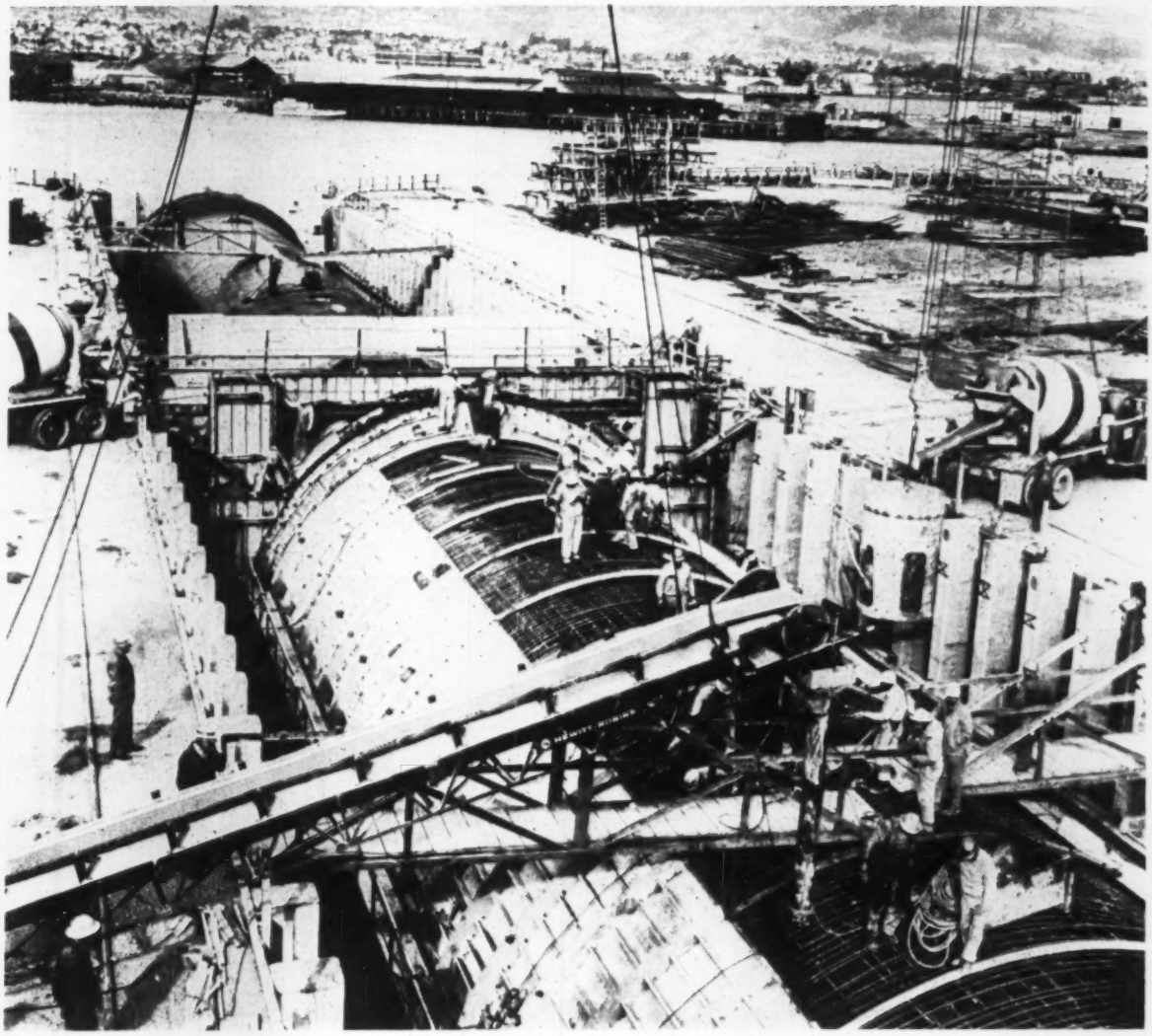
On a typical construction project, the inspector plays a key role. On his shoulders falls the burden of detecting substandard materials, methods and results and of reporting such violations to his supervisor for appropriate action.

In many agencies the inspector, particularly an inexperienced one, is very vulnerable. Too frequently short on formal education, unacquainted with details of good construction practice and inadequately paid, he is susceptible to the pressures that an irate contractor can bring to bear, and to the blandishments that an unscrupulous builder may offer in the interests of "improving job relations." As has been seen in the hearings of the Blatnik committee, to cite only one example, the results can be disastrous.

Public agencies can, and must, take specific steps to strengthen and support the inspector. They can do this by:

- Requiring a higher level of education.
- Increasing pay rates for inspectors.
- Giving a greater degree of job recognition.
- Providing better on-the-job training, including intensive short courses.
- Providing improved instructions and reference materials, including manuals that clearly define the inspector's responsibilities and describe good construction practices.
- Backing up recommendations of the inspector, and his supervisors, all along the line of command, from the bottom to the top.
- Providing more clear-cut paths to promotions.

Such measures will increase inspector morale, strengthen job control, eliminate direct causes of graft and payola and safeguard the expenditure of public money. They are long overdue as a sure means of improving construction's over-all performance—by strengthening its weakest link.



CREDITS: Owner, State of California, Department of Public Works, Division of Highways; Contractor, Pomeroy-Bates & Rogers-Gerwick.

Builders of Concrete Tubes Gain More Advantages with PLASTIMENT

In casting the twelve, 37-ft diameter, 200-ft long, segments of the new Webster Street Tunnel between Alameda and Oakland, California, the contractor chose **Plastiment**, the admixture which provided these specific advantages.

Increased workability at low slumps facilitated vibration and consolidation of the mix throughout the heavily-reinforced tubes. **Retarded set** extended the plastic period of the freshly-mixed concrete so that succeeding layers could be placed and vibrated together. **Rapid strength gain** speeded casting. Long-term advantages include **higher ultimate strength, minimum shrinkage** with consequent reduced cracking, and **greater uniformity.**

Plastiment is the admixture proven through years of on-the-job experience to provide specific and reliable advantages.

For full details about Plastiment Retarding Densifier, ask for your copy of Bulletin PCD-59. District offices and dealers in principal cities, affiliate manufacturing companies around the world. In Canada, Sika Chemical of Canada, Ltd.; in Latin America, Sika Panama, S.A.

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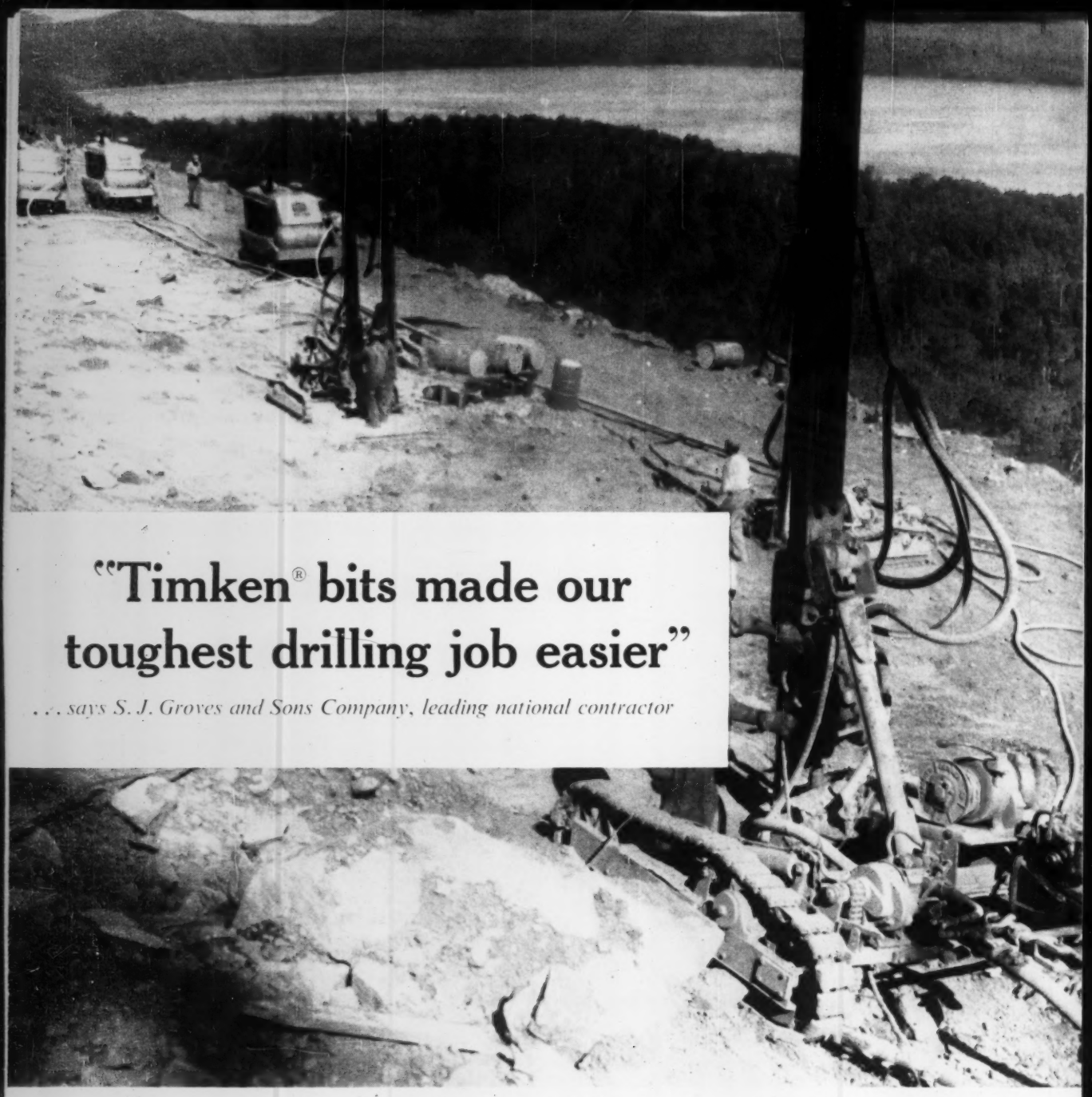

"Timken® bits made our toughest drilling job easier"

. . . says S. J. Groves and Sons Company, leading national contractor

"When we were building part of U.S.Highway 61 in northern Minnesota, we had to drill in tough rock formations—Ely Greenstone, lava basalt and granites", reports H. H. Westphal, Project Manager. "That's why we used Timken® carbide insert bits. They take *all* the punishment, make work easier."

One big reason Timken bits work so well is they have extra tough, special analysis carbide inserts. Another is their 5-front hole design, pioneered by the Timken Company which assures excellent hole cleaning. And on this remote job the helpful service of Timken rock bit engineers was an extra aid in getting the most from Timken bits.

On your jobs, use Timken carbide insert bits for greatest economy in hard, abrasive ground. In softer ground, use Timken all-steel multi-use bits. Both types fit the same drill steel. For the right Timken bit for your drilling, call our rock bit experts. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.

On-the-spot engineering service with

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removable rock bits